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ANNUAL REPORTS

AND

PROCEEDINGS

OF THE

BELFAST NATURALISTS' FIELD CLUB.

SERIES II.

VOLUME V.



1901

TO

1907.



Belfast:

PRINTED AT THE "BELFAST NEWS-LETTER" OFFICE

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1907.

PREFATORY NOTE.

HEREWITH are issued the Title Page and Index to Volume V. of the Second Series of the Club's Proceedings. The present Volume extends over six years, from 1901 to 1907, and has been edited throughout by the Hon. Secretaries. Mr. George Donaldson has kindly prepared the Index.

WM. H. GALLWAY,
W. J. C. TOMLINSON, } *Hon. Secs.*

July, 1907.

BRITISH MUSEUM NATURAL HISTORY

BELFAST NATURALISTS' FIELD CLUB.

FORTY-FIFTH YEAR, 1907-08.

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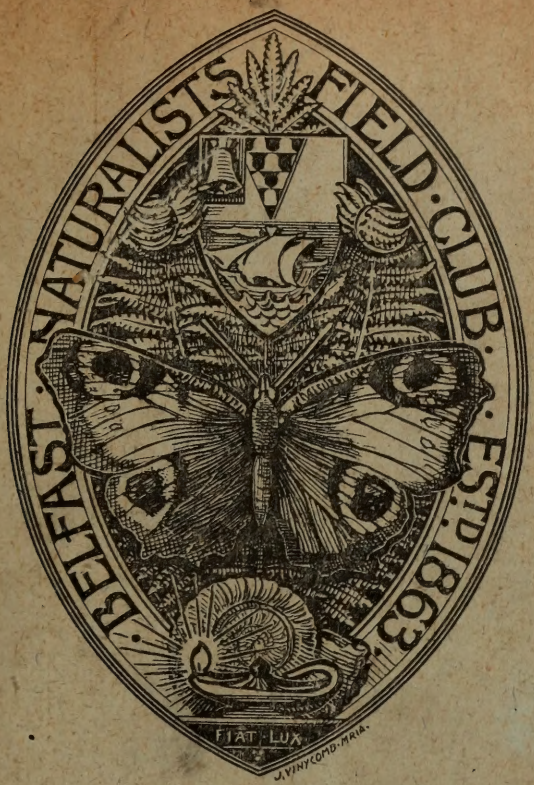
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15.

Annual Report & Proceedings.



BRITISH MUSEUM
NATURAL HISTORY

SERIES II. PARTS I.—II.

VOLUME V. 1901-02.
1902-03.

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ANNUAL REPORT AND PROCEEDINGS

OF THE

BELFAST NATURALISTS' FIELD CLUB

For the Year ending 31st March, 1902.

(THIRTY-NINTH YEAR.)

NATURAL HIST



SERIES II. PART I.

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1904.

BELFAST NATURALISTS' FIELD CLUB

THIRTY-NINTH YEAR, 1901-1902.

LIST OF OFFICERS.

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FRANCIS JOSEPH BIGGER, M.R.I A.

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Treasurer:
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ROBERT PATTERSON, M.R.I.A., F.Z.S., MALONE PARK, BELFAST.

Annual Report.

Your Committee beg to submit the following Report of the Proceedings of the Club for the past year, being the thirty-ninth Annual Report.

The work of the Club has gone on as usual during the past sessions, and the arrangements made at the first Committee meeting have been fully carried out.

During the Summer Session the following Field Meetings have been held:—

Scrabo Hill (half day)	25th May.
Benderg Bay	8th June.
Dublin and District (with I.F.C. Union) ..	18th—22nd June.
Cave Hill (half day)	6th July.
Coast Road	11th—13th July.
Benevenagh	10th August.
The Gobbins (extra excursion)	24th August.
Castlewellan	7th September.

At three of these excursions—Coast Road, Benevenagh, and Castlewellan—the attendance was much below the average. The practical work of the Club is done out of doors, and members miss many opportunities and points of interest by absenting themselves from excursions which are planned with the greatest forethought to contribute the utmost variety of interest possible.

The Winter Session opened with a most successful Conversazione in the Exhibition Hall; the exhibits were numerous and interesting, and the attendance was large.

The meetings of the Winter Session were as follows:—

1901.

28th Nov. Presidential Address: "The Franciscan Friary of Killconnell, County Galway." Mr. Francis Joseph Bigger, M.R.I.A.

11th Dec. The British Association: its Objects and Working. Mr. Wm. Gray, M.R.I.A. "Notes on Places visited on the Excursions of the British Association—Glasgow Meeting." Mr. W. J. Fennell, M.R.I.A.I.

17th Dec. 'How can the Municipal Technical Institute aid the progress of Natural Science?" Mr. Fras. C. Forth, A.R.C.Sc.I.

5—

1902.

21st Jan. Short Papers:—
Mr. George E. Reilly—"Recent Discoveries at Lough Mourne"
Miss M. K. Andrews—"Notes on Coast Erosion."
Miss Walkington, LL.D. — "Notes on places between Knock and Newtownards."
Mr. Nevin H. Foster—"On Feathers."
Mr. James Orr—"Sea Urchins: fossil and recent."
Mr. W. A. Green—"Notes on Mollusca imported on foreign fruits."
Mr. R. Welch—"Various Lantern Slides."

18th Feb. "The Teeth of Vertebrates"—Mr. C. M. Cunningham, D.D.S., L.D.S.

18th Mar. "Rush-lights, Cruisies, and other allied objects"—Mr. Robert May.
"Foraminifera from Knock Glen"—Mr. Joseph Wright, F.G.S.

22nd April. Annual General Meeting.

The Science Gossip Half-hour having proved beneficial, has been continued. Members are earnestly requested to contribute as many objects of interest as possible, and so add to the value of this informal meeting.

The Club has had to mourn the loss of two distinguished Honorary Members, Prof. Ralph Tate, its founder, and the Marquis of Dufferin and Ava. Resolutions of regret and sympathy were unanimously passed and were duly entered on the minutes.

Collections have been received in the Prize competitions as follows:—

Mr. H. L. Orr—Collection of Beetles.
Mr. James Orr—Collection of Liassic Fossils.

Appended are the reports of the Judges appointed to deal with these collections.

The reports of the Botanical Section and Lough Neagh Fauna Committee are printed *in extenso*. The Botanical Section continues to do useful work, under the presidency of Rev. C. H. Waddell.

The Geological Section has had under consideration the recommendations of the Corresponding Societies of the British Association.

Your Committee have also to report that the British Association meet in Belfast in September next, and consider it desirable that as many members of the Club as possible should become members of the British Association for the coming meeting. The Local Committee of the British Association have adopted the work done by your sub-committee in

the matter of preparing a handbook to the district, and many of your members occupy positions of responsibility in connection with the various Committees that have been appointed to prepare for the reception of the Association.

The thanks of the Club are due to Mr. B. D. Wise, of the Northern Counties Railway, for facilities given on the occasion of the excursion to the Gobbins; to our President in offering hospitality to our members on the excursion to the Cave Hill; to Lord Annesley for permission to visit his demesne and gardens at Castlewellan, and to Mr. T. Ryan for personally conducting our members on this occasion.

Jas. St. J. Phillips,
Robert Patterson, } *Hon. Secs.*

Reports on collections submitted in competition for Prizes offered by the Club:—

Collection for Prize XVI. sent in by Mr. H. Lamont Orr. "This collection comprises 206 named species of beetles collected in the district. They have been excellently prepared and mounted with extreme care, and we consider them well worthy of the Prize, being the best collection ever sent in for competition for this Prize. We have much pleasure in awarding the Prize to Mr. Orr."

S. A. Stewart.
Robert Patterson.

Collection for Prize IX. sent in by Mr. James Orr. "For Prize IX. Mr. James Orr has sent a very good set of Lias fossils, chiefly collected in Islandmagee. The specimens are well selected, nicely displayed, and include a number of the rarer forms. This collection fairly represents the Invertebrate fauna of Liassic times, and we have much satisfaction in awarding the Prize to Mr. James Orr."

S. A. Stewart.
Robert Patterson.

Report of the Committee of the Botanical Section for Session 1901-'02:—

Your Committee beg to report that the field work of the section was carried out during the Summer Session, as in

recent years, mainly by means of Saturday afternoon special excursions for botanical work.

Of course the exceptional opportunities afforded by the Club excursions furnished occasions for investigating districts not accessible within the time limit of an afternoon.

We are pleased to report, too, that the work of individual members throughout the year has been well maintained.

Six indoor meetings were held during the Winter Session in the Club's rooms, also on Saturday afternoons.

At five of these meetings Rev. C. H. Waddell, in a series of interesting and instructive lectures, dealt with the natural order of *Cyperaceæ*, whilst the sixth meeting was devoted to a series of short papers on botanical subjects.

During the session about fifty sheets of mounted plants, including a number of rare English specimens, have been added to the Herbarium.

ALEX. MILLIGAN, *Hon. Sec.*

Report of Lough Neagh Fauna Committee:—

R. Patterson spent seven days around Lough Neagh, and made many important notes. Six birds were added to last year's list, viz., Dunlin, Wigeon, Red-breasted Merganser, Sparrow-hawk, Tree-creeper, and Long-eared Owl. Some attention was paid to the Sticklebacks of Lough Neagh, and while the variety of the three-spined known as *Gasterosteus gymnurus* is by far the commonest species, the ten-spined—*G. pungitius*—was found in several localities.

H. L. Orr made four Saturday excursions, and continued the collecting of Beetles. A fair proportion of his captures have been mounted and named. None new to the British list rewarded his search; still, some rather rare species were taken. Mr. Halbert, of the Science and Art Museum, Dublin, kindly named them. It is to be regretted that the Belfast Free Public Library contains no suitable work on the Coleoptera, and that our citizens have to approach Dublin for work that they could do themselves, provided the facilities were placed within their reach.

H. L. Orr and R. Welch examined for mollusca on May 4th that portion of the Lough shore between Moore's Quay and Antrim Park. This narrow, marshy strip, subject to winter floods, has many shallow pools and drains that seem to be the nurseries for several species that are found in abundance a few months later in shallow water on the margins of the Lough, but rare or entirely absent in the deeper water. These are *Limnæa stagnalis* and *L. palustris*, *Physa fontinalis* and *Planorbis marginatus*. Some of the latter approach very closely *P. carinatus*. Two species were noted which seem new to the Lough fauna, *Aplexa hypnorum* and *Planorbis spirorbis*. The former has been recorded for very few localities in the North, but is exceedingly plentiful in these pools, though not found in the Lough itself. Both these species seem to prefer pools that dry up in summer. Twelve freshwater species in all were noted. Mr. W. A. Green found a large colony of *Hydrobia jenkinsi* at Bannfoot, where the river enters the Lough. It will be interesting to note if this colony spreads; it is local at present. This is the first find of a large number of this species in an inland station in Ireland. Except two living specimens at River-mouth, Antrim, all previous records were from the coast.

H. L. Orr.
Robert Patterson.
R. Welch.

Dr. THE TREASURER IN ACCOUNT WITH THE BELFAST NATURALISTS' FIELD CLUB Cr.

FOR THE YEAR ENDING 31st MARCH, 1902.

INCOME.				EXPENDITURE.			
To Balance from last	£9	11	2	By Printing, Stationery, &c.	£16	3	6
,, Subscriptions	72	5	0	,, Expenses of Conversazione	12	5	0
,, Entrance fees	5	15	0	,, Rent of Museum	11	6	0
,, Tickets for Conversazione	12	1	0	,, Loss on Excursions	2	6	4
,, Sale of Flora	0	8	3	,, Botanical Section	1	0	0
,, ,, Proceedings	0	13	0	,, Commission to Collector	2	18	6
,, ,, Lists	0	6	0	,, Donation—"Irish Naturalist" ...	2	0	0
,, Life Member's fee	3	3	0	,, ,, Irish Field Club Union ...	2	2	0
				,, Expenses of Lectures	3	7	0
				,, Postages	17	14	11
				,, Gas	1	11	11
				,, Delegates' Expenses	2	0	0
				,, Prizes	1	0	0
				,, Insurance	0	10	0
				,, Balance	27	17	3
	£104	2	5		£104	2	5

Audited and found correct,
S. A. STEWART.

W. H. PHILLIPS, *Treasurer.*

Proceedings.

SUMMER SESSION.

SCRABO.

(Half-day Excursion.)

The first excursion took place on Saturday, 25th May, 1901. At 2-30 the party started on brakes for the drive to Scrabo. After a spell of dry weather the roads were in a very dusty condition, which added to the picturesqueness of the procession, if not to the comfort of the excursionists. Passing over Queen's Bridge the brakes were soon bowling rapidly along the Newtownards Road. The shelter afforded by the trees at Stormont was appreciated after the glare of strong sunshine on the more open roads at Knock. The mound and church at Dundonald were soon passed on the way to the Kempe Stone. Here the party dismounted, and soon the entomologists had their nets opened in their hunt for specimens. The Secretary announced that a prize would be given for the best collection of flowering plants, which led many of the party to collect with great diligence during the remainder of the afternoon. This they had ample opportunity of doing, as the steepness of the roads necessitated a good deal of walking.

The party left the brakes at the west side of Scrabo Hill, and, led by Mr. Swanston, proceeded to the summit by devious ways. Some members pointed out the various geographical details and places of archæological interest. The botanists were deeply engaged looking for rare mosses, while the geologists found ample scope for their investigations in practical geology in the large quarries on the hillside. After spending an enjoyable and in some cases a profitable time on the hill the party drove into Newtownards. Tea was partaken of, and then the members visited the Priory of St. Columba. At 7-30 the brakes were again taken, and after

the climb of Bradshaw's Brae the homeward journey was undertaken at a rapid pace. The prize offered in the early part of the afternoon was won by Miss Steele.

BENDERG BAY.

The second summer excursion was held on Saturday, June 8th, to Benderg Bay. The admirable train arrangements of the County Down Railway allowed of an hour being spent at Downpatrick; this gives the traveller sufficient time to visit the Cathedral and the restored cross in the Cathedral grounds. The Secretary conducted the members through the Cathedral, pointing out the history of the building as read in the architectural remains of the original work, particularly in the ancient sculpture and carving. Another member gave a history of the ancient cross—the remains of which have been collected and carefully re-erected in the present appropriate position at the initiative of the Belfast Naturalists' Field Club.

Some additional members having joined the party, all proceeded by train to Ardglass, where cars were taken for Benderg Bay. Here the members dispersed, some along the shore, some to the top of the cliffs, to pursue their respective hobbies. Benderg Bay is a fine stretch of sand bounded on the north by Killard Point. Just beyond the high-water mark rise the steep cliffs of conglomerate with interstratified sands. Many of the rocks on the headland show the result of glacial action either in their rounded shapes or by the presence of well-defined striations marking the direction of the motion of the glacier. Ballyhornan Bay lies to the south of Benderg Bay, and though similar to Benderg is not on such a fine scale. Many of the members passed over to Gun's Island in quest of birds. All too soon the whistle sounded for the party to reassemble for the return home. On our way we stopped at the chapel at Chapeltown to inspect what some called a "bullan" stone, but what others deter-

mined as the font from the old church of Ardtole. Over the door of the chapel is built a slab of stone now painted black and gilded in such a way that the antiquary on the look-out for Anglo-Norman slabs would have much difficulty in recognising in this sample an old carved stone—an Anglo-Norman slab which was brought from the same church. From Chapeltown the party proceeded by the lane leading to Sheepland Harbour, close to which was seen St. Patrick's Well and St. Patrick's Road. An interesting talk ensued on the folklore of holy wells and their teaching for the past generations who resorted to them for spiritual and bodily healing. The field labours of the party now terminated, and a rapid drive brought them to the hospitable door of the Castle Hotel in Ardglass, where tea was partaken of before proceeding to Belfast. In the train members were enabled to compare notes on the day in comfort, as the railway company had reserved carriages for the party. Here the botanists exhibited their finds, which included the sea beet (*Beta maritima*) and the dewberry (*Rubus cæsius*) from Benderg. The coast thistle (*Carduus tenuifolius*) was plentiful, and in the marshes the orchid *Orchis incarnata*. On the sands the hound's tongue and sea holly were found, as well as some rare grasses and mosses, *Phleum arenarium and Koelaria cristata*. Tihrty-eight species of birds were noted. In the sandy cliffs of Benderg the jackdaw builds its nest at the end of sand burrows; here also the sheldrake was found breeding. On Gun's Island three species of tern were observed and eggs obtained, together with those of the pretty little ringed plover. The conchologists had a busy time collecting shells on the shores of the two bays—one lady securing *Trochus lineatus*, which is a local rarity. The beetles came in for some attention, and the records amply rewarded the members who pursued this branch of natural history. As a result of the day's work many intend to revisit this comparatively new but very interesting district to pursue a more detailed examination than could be effected in the all too short time of a single excursion.

DUBLIN AND DISTRICT.

The third Triennial Conference of the United Field Clubs of Ireland was held in Dublin on 18th till 22nd June, 1901, and was attended by nine members of our Club. The proceedings opened with a reception given by the Dublin Club to the visitors, at the Royal Botanic Gardens, Glasnevin, on the evening of 18th June. Tea and coffee were served in the open air, and the Curator of the Gardens, Mr. F. W. Moore, F.L.S., acted as conductor to the visitors, and demonstrated the most interesting features of the outdoor and indoor collections.

On Wednesday morning, on the kind invitation of the Royal Zoological Society of Ireland, a visit was paid to the Zoological Gardens in the Phœnix Park. In the unavoidable absence of the Secretary (Prof. J. D. Cunningham, M.D., F.R.S.), Dr. Scharff acted as conductor, and several interesting and instructive hours were spent in examining the very fine collection of animals. At 2-0 p.m. the party were received at Trinity College by Prof. E. Perceval Wright, M.D., and were shown by him over the College buildings and grounds. Later in the afternoon they assembled in the Science and Art Museum, where Mr. George Coffey, M.R.I.A., conducted them over the Royal Irish Academy's collections, drawing attention to the value of the various groups of objects in demonstrating the principles of pre-historic chronology. Subsequently the members were received in the Botanical Division by Prof. T. Johnson, D.Sc., who showed the systematic and economic collection of plants and plant products. Especial interest was taken in the seed-testing apparatus recently installed by the Department of Agriculture, and already fully employed. In the evening some members visited the sand-dunes of the North Bull, under the guidance of Mr. J. N. Halbert, while others followed Mr. H. J. Seymour to the cromleacs of Shangannagh and Glen Druid.

Thursday was devoted to a whole day excursion to Glendalough. The party travelled to Rathdrum by the 10-10

train, and thence took cars to the Valley of the Two Lakes. Time permitted of a tolerably thorough but rapid examination of the many antiquities and of the lake shores, and a very enjoyable day was spent, rain which came on towards evening interfering but slightly with the day's programme.

On Friday morning the naturalists of the party took the 9-15 train to Portmarnock, whence they walked over the sand-hills and northward to Malahide, collecting many of the characteristic plants and animals of that rich locality. The antiquaries visited Christ Church Cathedral, where they were met by Sir Thomas Drew, R.H.A., under whose skilled guidance they visited every portion of the buildings. In the afternoon all assembled at the Natural History Museum, where Dr. Scharff, Mr. Carpenter, and Mr. Nichols demonstrated in turn the study collections, the general collections of invertebrate and vertebrate animals, the collection of Irish animals, and the geological and palæontological collections. Dr. and Mrs. Scharff kindly entertained the party to tea. In the evening the Field Club Conference was held. In the unavoidable absence of Mr. F. J. Bigger, M.R.I.A., President of the Senior Club, the chair was taken by Prof. G. A. J. Cole, F.G.S. The short address which Mr. Bigger had intended to deliver was read by the Secretary (Mr. Praeger). Mr. Carpenter followed with a paper on "The Dublin Museum and Irish Naturalists." Prof. Cole gave an address on "Scenery and Geology in Dublin and Wicklow," pointing out, with the aid of a large series of lantern slides, the geological significance of the various natural features viewed on the excursions of the preceding days. Mr. Praeger spoke on "The Present State of our Knowledge of the Irish Flora," and exhibited a series of maps illustrating the history of botanical research, and showing which portions of the country were now most in need of attention at the hands of the field botanist. Mr. R. J. Ussher drew attention to the important work that lay open to Field Club members in the domain of ornithology, and especially emphasised the desirability of extending our knowledge of the distribution of birds, and of

enlarging the collection of Irish bird skins in our National Museum. The remaining speakers included Mr. W. H. Patterson (Belfast) and Mr. Abraham Shackleton (Dublin).

On Saturday morning the final excursion of the meeting was held. The party took train at 10 o'clock to Howth, and proceeded by the cliff walk to above the Bailey Lighthouse, whence they crossed the hill to the cromleac, and descended through the demesne to Howth town, where lunch was served at the St. Lawrence Hotel. The 4-5 train brought the members back to town, when the party broke up.

CAVE HILL.

(Half-day Excursion.)

This, being a half-day excursion, was largely attended by members and friends, who, assembling at Castle Junction at 2 p.m. on 6th July, proceeded to Ligoniel by tram, and walked across the high country between Cave Hill and Collinward. On the summit of Cave Hill the extensive panorama was described in detail by some of the members, and attention was directed to a line of old forts, some of which had only recently been discovered by the President of the Club. Proceeding along the ridge of the hill, and descending by easy stages, the site of one of these forts was inspected with interest, a local gentleman describing the various articles which had been dug up. The kestrel was noted as breeding in one of the cliffs of the Cave Hill. The botanists were pleased to find growing in profusion side by side the adder's tongue and the moonwort ferns (*Ophioglossum vulgatum* and *Botrychium lunaria*). Having reached the Glengormley Road, the party proceeded to Ardrie, where all were hospitably entertained by the President, Mr. F. J. Bigger, M.R.I.A.

COAST ROAD.

The fifth excursion of the Summer Session, known as the "long excursion," was held on the 11th, 12th, and 13th

July, the place chosen being the celebrated "Coast Road." Members and friends assembled at the Northern Counties Station on Thursday morning in time for the 9-55 train, and, although the party was not quite so large as was anticipated, the enthusiasm of each member for his or her own particular hobby more than compensated for this.

On arrival at Larne Mr. M'Neill's well-appointed brakes were waiting for the party, and the drive along the Coast Road was commenced. The first stopping-place was Waterloo, where the members spent some time examining the lias and rhaetic beds. Here the geologists were in their glory, and many characteristic fossils were obtained by means of chisel and hammer. On the land side of the road the overlying beds of greensand were next visited, and one of the geologists gave a short but interesting account of the position of the various beds, and the meaning of what had just been seen. Resuming seats, the party proceeded along the coast through the Black Cave Tunnel to Ballygalley Head, where the well-known "corn sacks" were noted. Passing O'Halloran's Castle, which stands on an isolated rock, one of the numerous legends connected with it was related, and while still musing on the long distant past a more modern structure diverted attention—namely, Ballygalley Castle, a small but quaint specimen of Scottish baronial architecture, built in 1625. Additional interest was added to the hasty inspection of the castle by the valuable account of it in the latest number of the "Ulster Journal of Archæology." The Ballyrudder gravels were next noted, being celebrated through the investigations conducted by the B.N.F.C. some years ago. At the "Madman's Window," on the south side of Glenarm, a considerable time was spent. Here the members had lunch, and visited the quarries, and, in spite of the rain which was then coming down somewhat heavily, good collections of plants, shells, and beetles were made. Several photographs were taken here, and it was with reluctance that this charming spot was left behind. Glenarm was the next stopping-place. While the horses were being rested and fed the party visited

the large chalk quarry on the Larne Road, and several good fossils were picked up.

The large landslips between Glenarm and Carnlough were observed with interest, and, had time permitted, no doubt many fossils could have been obtained from the lias clays exposed there. The next halt was on the north side of Carnlough, where a small stream was examined and some specimens of the fresh-water limpet obtained. The best find of the day was *Helix intersecta*, being new to East Antrim. By this time the rain had cleared off, and the waterproofs were not needed again. At Garron Point the party stopped again, and, sending the luggage up to the hotel, spent some time examining the cliffs and rocks. Photographs were taken of the most interesting objects, and gradually the ascent to Garron Tower was made by the back avenue, from which unfrequented road many magnificent landscapes are to be observed.

On Friday, the 12th, although breakfast was at eight o'clock, the photographic section had secured several pictures before the gong sounded. After breakfast the party divided, the main body continuing the geological investigations of the previous day, examining the old fort and the natural history of the undercliff. After lunch this section continued the drive round the coast road, stopping frequently by the way, and drove slowly up the beautiful Vale of Glenariff. In the meantime the walking party, leaving Garron Tower at nine o'clock, ascended the steep cliffs at the back, and began the examination of the botany and zoology of the moorland and bogs comprising the plateau. Several small lakes were visited and collections made in various branches of natural science. Everything being of value from these high grounds, a most miscellaneous collection was made—plants, flowers, grasses, beetles, spiders, shells, moths, butterflies—nothing seemed to come amiss to the enthusiastic naturalists. The most important discovery of the day was a colony of Herring Gulls (*Larus argentatus*) breeding beside one of the lakes, being the first inland breeding-place known in Ireland,

although thousands breed on our sea-cliffs all round the coast. This discovery caused a long delay, and, after patient search, an egg was found and carefully wrapped up and taken away. For this and other reasons, the walk took longer than was anticipated, but fatigue was speedily banished on meeting the first section at the Teahouse in Glenariff. Here the party was increased by the welcome addition of some members staying in Cushendall. Mounting the brakes the drive down Glenariff was begun, the whole valley being bathed in the evening sunshine. Near Waterfoot the sea holly was observed growing in abundance. At Cushendall, Mrs. Millar, the kindly hostess of the celebrated Glens of Antrim Hotel, was ready to welcome the party, and soon all were discussing a good dinner. Afterwards the party visited the hospitable house of the Cushendall friends, and a very pleasant evening was spent, the more serious labours of the day giving place to light-hearted conversation and anecdote. After supper had been gracefully dispensed, the hotel was again sought, and soon quietness reigned supreme.

On Saturday morning, after eight o'clock breakfast, the party mounted the brakes and drove to "Ossian's Grave." Here they were met by Mr. Alexander M'Cloy, R.D.C., who very kindly gave a most interesting account of the traditions and folklore connected with the place, and pointed out other objects of interest in the vicinity. The "grave" was photographed, and, after expressing their thanks to Mr. M'Cloy, the drive to Cushendun was resumed.

On arriving here the celebrated caves in the old red sandstone were visited and thoroughly explored, while a member gave an account of their geological history. Returning from the caves, the members were gratified to meet with their esteemed President (Mr. F. J. Bigger, M.R.I.A.), who had come to join the party for a short time. After inspecting the remains of Garra Castle, the steep ascent of Tornamoney Hill was undertaken in order to visit Tornamoney Cashel. The large circle of stones is between 50 and 60 feet in diameter, and has a chamber in the thickness of the walls, which

was explored by the more juvenile members of the party. Another cashel on the opposite side of the hill was next visited, but it was found to be in bad preservation and hardly worth the climb. However, the view from this point was very fine. Descending the hill, Cushendun was again reached, and soon the drive back began. Dinner was served at four o'clock in Cushendall, and all too soon the signal for the homeward journey was sounded. Bidding farewell to Mrs. Millar, and with a parting cheer for the Cushendall members, the drive to Parkmore through Glenariff commenced. The views of the road up the valley were magnificent, and it was with regret that Parkmore was reached. After a quick run to Belfast, the party separated, the members expressing their delight at the amount of enjoyment combined with instruction each had experienced.

BENEVENAGH.

10th August.

This excursion, owing to the inclement weather, attracted only two members, who duly carried out the programme, but no report was supplied.

THE GOBBINS.

Among the seventy members who joined this excursion on 24th August were to be found botanists, conchologists, geologists, and a large proportion of members who joined as excursionists, without any other hobby than to enjoy an afternoon in the country. All were catered for in their respective pursuits. About one-half of the party started by the 12-50 train for Ballycarry station; arriving there cars were in waiting, and the majority of the party proceeded rapidly to the coast, passing over the main roads for a short distance, and then taking the pleasing by-roads with which the district is ramified, till they reached the high ground overlooking the North Channel. Here they descended from the cars, and proceeded on foot to the shore. In former years

it was somewhat difficult progress, but on this occasion it was easily undertaken by everyone, as convenient styles or foot-bridges have been erected by the Northern Counties Railway Company at all difficult places. Passing the first headland a fine comprehensive view of the coast was obtained; in the distance the bluff head of the Gobbins, reminding one of Fair Head, or some of the well-known headlands at the Causeway. In the middle foreground large masses of white chalk have fallen into the sea, and give variety to the coast line, paved with a multitude of pebbles, well-rounded chalk predominating; in the immediate foreground a steep wall of black basalt rises, and casting its shadow over the path gives charm to the foreground, and lends perspective to the distance. As soon as we had grasped the features of the landscape we turned to the details near at hand, and found romance and mystery in the Smugglers' Cave. Truth is stranger than fiction, and local history stranger than romance. "Here in this cave Lieutenant Moses Hill, the head of the now great house of Downshire, lay concealed in 1588, after the disastrous affray with M'Donnel, at Altfracken, when the Scot put to flight the soldiers from Carrickfergus, and Sir John Chichester lost his head." A stone wall or screen extends across the mouth of the cave, and commands the narrow entrance with its rifle embrasures. At present much of the entrance is obscured from view, as debris has fallen from the overhanging cliff, and masked the screen on the outside, but on the inside the details of the wall are clearly seen.

Soon the geologists came upon the small exposure of Lias clay, a stiff blue clay, which when saturated with water becomes plastic, and, underlying the Chalk and Basalt, has formed an insecure foundation for the overlying rocks, with the result that small landslips form a feature in the scenery where such a combination of rocks exists. Fossils were found in abundance in the short time at our disposal, even our youngest members picking up such specimens as *Cardinia listeri* and *Ostrea*. A little further on there are little cliffs showing sections of the Cretaceous rocks with their various zones

from the Glauconitic Sands with their Brachiopods and fish remains at the base to the compact white Limestone at the top. Near Hillsport the character of the Chloritic sands was well seen in the slipped masses of the undercliff, some abounding in Inoceramus bands, and in some four places yielding spines of an extinct urchin (*Cidaris*), sponges (*Ventriculites*, *Camerospongia*, and *Etheridgia*), shells such as *Rhynchonella* and *Pecten*, and many others of species now extinct.

A short way ahead appeared the hospitable cottage of Mrs. Hill, where tea is to be obtained. Close to this is a well-marked pathway leading round the foot of the Gobbins cliffs. This path has been carried round the foot of the headland well above high water mark along the ledges of basalt, and where walls of rock used to meet the traveller in former visits he will now find short tunnels cut through the solid rock. Where a gaping chasm yawned there is now a hanging bridge constructed of bearers of rolled iron girders with a footway of solid plank; even the nervous need not fear to pass, for the sides of the path are furnished with a wire railing to stout uprights of iron, which have a sure foundation deep in the rock. Our party was conducted by Mr. B. D. Wise round this path till we reached the first of that great series of caves that are to be found at the foot of the Gobbins cliffs. In the cool shelter of the caves we found the rocky walls covered with the most delightful sap greens—a closer inspection revealed ferns and liverworts of many varieties. *Asplenium marinum* and *Scolopendrium vulgare* var. *crispum* were growing in the greatest perfection on the sides of the cave and also from parts of the roof. Some members proceeded a considerable distance into the cave, but did not succeed in reaching the end. Mr. Wise, the engineer of the Northern Counties Railway, explained the intention of the Company to carry the path further round the cliffs to reach some more of these famous caves,* and ultimately they hope to provide access to the group of seven caves further along the coast.

* This has now been carried out almost as far as the first of the "Seven Sisters' Caves.

It is, however, the geologist that can best gain an idea of the beauty and grandeur of the place; these headlands are the products of a comparatively recent age, which geologists term broadly the Tertiary Period. A great interval of time elapsed between the formations represented by the Chalk and the basalt found in these headlands. The Chalk is the record of a time when the whole of the County Antrim was submerged beneath the sea; the remains of the deep sea fauna are still to be found as fossils embedded in the chalk. Since these animals lived many changes in the earth have taken place; what was the old sea floor was elevated and again became dry land, bleak and barren in many parts, as the nature of the Chalk is such that its decomposition did not result in forming a fertile soil such as now covers the country. Instead of being rich in the material that plants require for their growth and nourishment, the surface of the ground was covered with flints such as may be seen on the top of the chalk underlying the basalt in the Whitehead quarry. Finely comminuted chalk particles and a thin ochreous bed accumulated along river valleys, but even here the vegetation must have existed for long ages till the life in the adjoining sea had changed—one species after another dying out or being replaced by another form. At last, in the early part of the Tertiary times, great earth disturbances took place all over the County Antrim, and far north to the West of Scotland and the Faroe Islands. Volcanoes burst forth in places, large rents and fissures occurred in the chalk rocks or surface rocks in this wide area; through these fissures and from the volcanoes issued great flows of basalt in a highly heated and fluidal condition. All this matter was of basic composition; that is, it contained a much smaller percentage of silica in its composition than does granite, which geologists term an acid rock. Molten basic rocks retain their fluidity for a longer period than do acid rocks, and the consequence is the basalt flowed as sheets over large districts, overlapping another at its edges. When one sheet had solidified there may have been a period of rest during which the upper sur-

face of the sheet became subject to atmospheric influences, wind, and rain, which decomposed the surface, forming a thin coating of soil. As the basic rocks contain a large proportion of iron, so we find the resulting soils containing also much iron. Sometimes the alumina compounds were washed into the valleys, and from such soils have resulted the substance known as bauxite, from which aluminium is extracted, as in the works at Larne Harbour. But after a short interval another outburst would occur—another lava flow take place, covering up and scorching the thin coating of soil, and leaving a reddish band as the only remnant of the soil and vegetation that had flourished, and marking the limits of one flow from another. Such a course of events can be traced in the fine headlands of the Gobbins, where one flow is distinctly marked from another by these red bands, and also by the difference in character of the respective flows. Some of the beds are massive and black, others are black, but contain cavities filled with white crystalline matter known as zeolites. These can be admirably studied in the Gobbin rocks, and open up a wide field for investigation. Have these zeolites crystallised from highly-heated vapours, or have they resulted from chemical changes that have taken place in the rock after its deposition, or have both methods been employed by Nature? Volcanic action has now ceased as far as our country is concerned, but the same disturbances only shifted further north, changing in character, and are still to be found in operation in Iceland. But what is left to us in Antrim and the various islands of the West of Scotland is only the remains of a vast plateau of basalt that covered the entire district. The channel that separates the Antrim sheets from the Scottish must, therefore, represent a vast period of time during which denudation has been going on steadily but surely; during this period of time the sea and air have weathered away the intermediate rocks, and leave us now the bold cliffs which form the striking scenery of our Antrim coast. Face to face with these precipices of the Gobbins we have some of the most momentous lessons of geology deeply

imprinted on our minds, and we surely learn more than ever to appreciate the efficiency of the seemingly insignificant forces that are sculpturing and moulding the landscape, which everyone, be he field naturalist or tripper, can enjoy in proportion as he brings a mind prepared to appreciate the subject. But the interest is not confined to past history. The banks and fields are gay with flowers; in the proper season we have observed the Bladder Campion, Sea Pink, Lady's Fingers, Venus' Comb, and many other wild flowers. Bird life is abundant among the eeries on the cliffs; the Peregrine Falcon and the Herring Gull find a home in the fastnesses of the rocks. Butterflies, too, are in abundance through the fields, one member noting the rare Peacock Butterfly (*Vanessa io.*)

The members returned to Ballycarry, where the evening train for Belfast was taken.

CASTLEWELLAN.

The last excursion of the Summer Session was held on 7th September. Lord Annesley had kindly granted permission to visit the demesne and gardens attached to his fine country seat at Castlewellan. The party which assembled at the County Down Railway was a small one, as some were deterred by fear of rain, but what was wanting in numbers was made up by the zeal of those who were present. Arriving at Newcastle, we proceeded immediately by cars to Castlewellan. Heavy clouds capped the heights of Slieve Donard, but the summit of Thomas Mountain and many of the other prominent peaks of the Mournes were visible. Passing through the town of Castlewellan, we soon reached the gates of the fine park lands in which the residence of Earl Annesley is situated. A few minutes' pause at the gate allowed us to approach the picturesque entrance lodge, which was covered with a blaze of colour, produced by the scarlet flowers of *Tropæolum speciosum*. Driving along the

avenue we noticed that many of the trees were beginning to take on the bright autumnal tints. Descending from our conveyances at the entrance to the garden, we were met by his Lordship's head gardener, Mr. Ryan, who accompanied us for several hours, pointing out the many rare and special plants and trees, which grow in the greatest profusion in these gardens. The members of our party who were possessors of small gardens and greenhouses asked many questions as to plants and methods of culture, all of which were answered in the fullest manner by Mr. Ryan, and many notes were made of plants and flowers which our amateur gardeners will no doubt make full use of in their own humble parterres. We were soon introduced to and got familiar with a few of the plants from Japan, Australia, California, and Chili, and then, pausing for a few minutes, we were enabled to examine the general effect produced by these details of the landscape. Attempts have not been made to force effects; the plants and shrubs are not cut up into the fantastic shapes that render some other "modern" gardens so hideous and artificial looking. Some cutting has been done, but it is only what is required to keep the plants healthy, and to show their natural forms to the best advantage. The gently rising ground on which the garden is situated allowed us to obtain many points of view over the arboretum.

Taking the shrubs first, Mr. Ryan directed our attention to a perfect specimen of *Pittosporum Mayii*, the native country of which is not known, clothed to the ground with foliage, and measuring 12ft. in height; another, equally perfect in outline, was 15ft. high, and about 14ft. in diameter. Some idea of the variety of species of the different plants may be gathered when we say that the garden list contains some ninteen species of *Pittosporum*, including *P. macrophyllum variegatum* and *P. eugenoides variegata*. The plants are perfectly hardy in these gardens, and no doubt would flourish well in many of the milder localities in Ireland. They are neat and graceful shrubs, and would make a pleasing variety if introduced into some of our local parks or gardens, instead of

the ubiquitous laurel or rhododendron. A small bush of *Eucryphia pinnatifolia* attracted much attention, with its large and sweetly scented flowers. *Lomatiæ*, fine foliage plants, which are usually regarded as cool conservatory plants, do well here; a specimen of *Lomatia pinnatifolia*, six feet high, has stood out for several years, and has foliage of a healthy dark green colour. Clumps of bamboos dotted the lawns, grouping well with a background of rhododendrons.

Proceeding from the gardens, we went through a number of glasshouses, some containing bananas and oranges growing luxuriantly, and producing large clusters of fruit. The vine-houses were in splendid condition, promising many bunches of the choicest varieties of grapes. Next we visited the stove-houses, and later on were charmed with the variety of *gloxiniæ* of all shades and colours, and also with the orchids. Passing through the winter garden, we entered the nursery, where our eyes soon rested on a fine eucalyptus, some 40ft. high, and twenty-four years old. *Eucalyptus cordata* also was in splendid condition. Some of our members were delighted with the variety of plants belonging to the groundsel family. Some of the *Senecios* are shrubs with a good deal of character in their foliage, and are scarcely to be recognised as belonging to an order which includes our common groundsel. The Japanese maple was just beginning to assume the rich deep tints of autumn, and caused many brilliant patches of colour among the shrubs.

Near to the side of the lake we visited the old standing-stone, and close to it held our formal meeting. Rev. C. H. Waddell proposed that the best thanks of the Club were due to Earl Annesley for his kindness in opening his gardens and grounds to the members of the Club, and to Mr. Ryan, his very capable head gardener, for his attention in conducting them over the place. The motion was seconded by Mr. Wm. Gray and Mr. J. St. J. Phillips, and was passed with much applause. The election of two new members brought the meeting to a close. Parting from Mr. Ryan, we proceeded along the path that winds round the lake, and many pretty

peeps of the castle were obtained from this road. The day was somewhat dull, though there was no actual rain; owing to this no insects were taken, and but very few shells.

Mounting cars again, we proceeded to Maghera, there inspecting the round tower and the old church, which is situated in the centre of an ancient fort. Ferns were here abundant, and a few specimens taken. Our next stop was at the door of the Downshire Arms Hotel, where Mr. Alexander Moore catered for our wants with that hospitality for which all his establishments are noted. Proceeding to Belfast in the train, the chief subject of conversation was a comparison of the gardens we had visited with others we have seen elsewhere, and the general conclusion was that their arrangement and condition reflected highly on the personal care and attention that were bestowed on his grounds by Lord Annesley.

Winter Session.

ANNUAL CONVERSAZIONE.

This was held on 14th November in the Exhibition Hall of the Botanic Gardens. Tea was served at seven o'clock, and the tables were presided over by some lady members of the Club. After tea, the members found plenty to attract their attention in the numerous exhibits which had been arranged about the room. Mr. M'Kimm had given valuable assistance and advice in the settling of the room, so that the exhibits were shown off to the best advantage. The following objects were displayed and explained by their respective owners:—Botanical exhibits—New and rare plants of County Down, by Rev. C. H. Waddell, B.D.; rare mosses and hepatics —some new to Ireland—and brambles from County Down, new to science, by Rev. Canon Lett, M.A.; rare plants recently found in Ireland by Mr. R. Ll. Praeger, M.R.I.A.; mounted botanical specimens, the property of the Municipal Technical Institute, by Mr. F. C. Forth; mounted specimens of plants collected on the summer excursions, by Mr. N. Carrothers. In the Zoology section the living animals attracted much attention. Mr. Robert Patterson had Irish hedgehogs; Mr. Hamilton, natterjack toad and Jersey toad; Mr. W. H. Gallway, lizards. These gentlemen also exhibited other objects—silk moths and skulls. Professor Symington had an exhibit of cuttle-fish, collected on the coast of Normandy; while Mr. M'Lean exhibited an octopus and several other rare specimens collected on the shore near Holywood during the week. Mr. S. M. Stears' large and systematically arranged collection, comprising birds' eggs, butterflies, and moths, represented much labour, which was duly appreciated by the numbers who crowded round his table. Mr. Nevin H. Foster had a fine

instructive series of birds and eggs illustrating comparative sizs of eggs laid by birds of about the same size. Mr. R. Welch, Mr. H. Lamont Orr, and Mr. W. A. Green had very large collections of land and freshwater shells, excellently mounted and named. Mr. Geo. E. Reilly exhibited shells and beet. Miss M. K. Andrews' exhibit dealt very fully with the orbicular granite of Mullaghderg, the actual rock specimens, with micro-slides and photographs of the locality, dealing exhaustively with her subject. Mr. Joseph Wright, F.G.S., had foraminifera from the raised beach of Sherkin Island; Mr. Bulla, fossil fish from carboniferous shale beds; Mr. Robert Bell, cretaceous *cephalopoda* from Counties Antrim and Derry; Mr. James Orr, a beautiful collection illustrating sea urchins, recent and fossil. Mr. T. Brown's collection of precious stones and gems found many admirers. The President, Mr. F. J. Bigger, M.R.I.A., had a varied exhibit consisting of the following:—An ancient Irish mether, found near Monivea; Irish scales and weights, fragments of pottery recently discovered on Cave Hill, and a fine collection of weapons recently in use in New Zealand. Miss M. C. Knowles had objects from prehistoric sites in County Clare; Mr. George E. Reilly, recent finds from crannoges of Lough Mourne, including remains of the "Irish elk;" Mr. Robert May, stone implements from County Antrim, fossil *nautili* and silicified wood from Lough Neagh; Mr. W. J. Fennell, measured drawings of souterrains in Antrim and Down. In the Archæological section the exhibit that attracted most attention was the valuable collection belonging to Mr. Robt. Day, M.R.I.A., of Cork; this showed that the recent craze among the ladies for wearing strings of beads was only the revival of an old fashion prevalent among the ancient inhabitants of Ireland and Egypt. Mr. Day's collection contained many specimens collected from crannoges and other sites throughout Ireland, and fine specimens from Egypt. Mr. J. J. Phillips had a number of drawings of Anglo-Norman architectural remains in Ireland. Madame Christen exhibited sketches of the prehistoric city of Devanha on Dinnet

Moor, photographs of Spanish gypsies as modern cave dwellers near Seville, specimens of Kiesulguhr from Aberdeen, and other objects. Mr. John Vinycomb, M.R.I.A., showed some delicate specimens of three-colour process work from large half-tone blocks; Mr. W. H. Patterson, M.R.I.A., water colour sketches of Irish subjects; Miss Andrews, an early example of photography and some very fine views of the Antrim coast painted by Andrew Nicholl, 1828. Mr. W. H. Phillips had a number of rare ferns, and variations in mistletoe; Mr. J. H. Davies, rare mosses collected in the Hebrides by Dr. Braithwaite, and some from Ireland; the structure and form of the leaf of one of these was seen through Mr. Gray's microscope, and much admired. Miss Wheeler had a few specimens of protective mimicry in animals and a trap-door spider's nest; and Mr. Godfrey Macoun, delicate samples of objects in jade and agate from China. During the evening many gained instruction from Mr. Gray's micro-demonstration of form and colour in natural history objects. The collection as a whole was one of the finest that had been got together in recent years, and reflected great credit on the various exhibitors.

A short business meeting was held during the evening, when the President (Mr. F. J. Bigger) gave a short address. In the course of his remarks he called attention to the comprehensive character of the exhibits, and referred to the names that many of the members had made for themselves in their respective studies. Speaking on the subject of the destruction of animals, he said—It is painfully sad to see the often-repeated paragraphs in our papers of the capture and destruction of wild birds, and of our rarer animals and of the bird visitors that occasionally favour us with their presence. Our rare birds are now almost extinct. Could not their habits be noted and their presence rejoiced in without their slaughter being occasioned? Do we not all strongly object to our lady friends decking their heads with borrowed plumage, thus entailing the destruction of thousands of our most beautiful birds? Why, then, should we wish to see the rarer

ones moulting under glass cases in impossible attitudes? Our motto should be "To study, not to destroy." In Archæology we have to condemn the destruction of our ancient monuments and the dispersal of our most valued relics to the four corners of the globe. It is not alone the loss of our gold ornaments that we deplore; our bronze and rarer stone implements are fast leaving our shores, and this should be crusaded against by such societies as ours, to prevent this national loss and disgrace. I speak feelingly on this subject, for I know of cases where dozens of our most unique bronze swords and other implements have been bartered and sold to the foreigner by irresponsible jobbers at home. Referring to the forthcoming visit of the British Association, the President stated that the Club was rendering valuable services to the general committee representing the city, which had charge of the arrangements. Mr. Bigger then thanked the members for the position he occupied as their President. To follow in the chair occupied by such eminent men as Professor James Thompson, Canon MacIlwaine, General Smyth, and Canon Grainger was no small satisfaction. Particular reference was made to the loss science had sustained in the death of Professor Ralph Tate, one of the original members and founders of the Club. After the President's remarks a short lantern display was given; Mr. A. R. Hogg ably manipulating the lantern, showed some fine examples of natural colour slides by the Sanger-Shepherd process. Mr. Welch showed a few slides illustrating phenomena in connection with blown sands and sand dunes at Newcastle, followed by illustrations of eggs of birds and snails. Mr. Wm. Gray and Mr. J. St. J. Phillips showed a number of slides illustrating the summer excursions, and briefly described the objects represented. A number of new members were elected, and an interesting feature was the presentation of prizes for collections sent in for competition for the valuable prizes offered by the Club. These prizes were secured by Mr. W. A. Green, for a collection of land and freshwater shells; by Mr. James Orr, for a collection of liassic fossils; and by Miss Steele, for a collection of flowering plants made

on the first summer excursion to Scrabo. It was a late hour when the members dispersed, so great was the interest shown in the exhibits.

TRIBUTE TO THE LATE PROFESSOR TATE.

The Club held the first meeting of the Winter Session on Thursday, 28th November. Before the formal business of the night, a number of the members gathered in the room for the "Science Gossip" Half-hour. As usual this proved one of the best means for furthering the objects of the Club, in giving members an opportunity of discussing points of interest, and several members brought natural history objects to exhibit. At eight o'clock the President took the chair, and called upon the Secretary to read a communication. Mr. J. St. J. Phillips said the communication referred to the death of one who might be considered the father of the Belfast Field Club, a man who had been guide and friend to the older members, and was still the model of a scientific man whose achievements the younger members would find hard to approach, if not actually impossible to rival. The communication was prepared by an intimate friend of our founder, and we are sorry that Mr. Stewart does not feel able to read the following himself:—

"It is with feelings of the deepest regret that I, this evening, have to announce the death of a distinguished scientist, Professor Ralph Tate, F.G.S., F.L.S., the virtual founder of the Belfast Naturalists' Field Club. As many of those who have been added to this Club in recent years are unaware of the circumstances which led up to Mr. Tate's connection with Belfast and its Naturalists' Club, I shall very briefly state how it came about. The Government Department of Science and Art was originated in 1852 with the object of spreading scientific and artistic culture throughout the country. One of its methods was by originating courses of scientific lectures where such were desired. In pursuance

of this object Professor Jukes, of the Irish Geological Survey, was commissioned to lecture on geology in Belfast. Some of you will probably remember these very profitable meetings, which were held in the old Music Hall, May Street. Professor Jukes succeeded in raising a considerable amount of interest in his subject, and I presume that some here have not forgotten his concluding meeting, which was held at the Cave Hill quarries, and was attended by some 300 of his hearers. This was the first scientific field meeting of Belfast people, and revealed a hitherto unsuspected want. Thus the ground was prepared for the coming man and for the advent of an organisation which should combine the teaching of the lecture hall with the practical application of its lessons by visits to choice scenes where those abstract lessons could be tested in the concrete. A further forward movement was now made by the formation of a local lecture committee, who succeeded in arranging with the Science and Art Department for the establishment of science classes in Belfast, which should be followed by examinations and prizes. To the credit of the Belfast Natural History and Philosophical Society, it may be stated that the sixteen members of this committee were all active members of that organisation. What was wanted here was an 'all-round man,' with ability to expound and enthusiasm to inspire, and this we obtained when the Department sent us Mr. Tate to conduct our classes. The subjects taught by him were geology, mineralogy, systematic botany, vegetable physiology, zoology, animal physiology, and physical geography, and the success attending his teaching was most marked. At that time the Department had only classes in eleven localities, and for answering in geology thirteen first prizes were awarded as a result of the examinations in 1862. Eleven of these came to Belfast, and of the eight medals given we secured six. These details may seem unnecessarily lengthy, but they lead up to Mr. Tate's influence on the birth of the Club. These classes in the Museum were continued until the spring of 1864, but meantime (January, 1863) Mr. W. T. Chew, a gentleman who has long since left Belfast, and

whose subsequent history I am unable to trace, wrote to the *Northern Whig* explaining the working of Naturalists' Field Clubs, and urging the formation of one in this town. This was taken up at once by some of the geology class, who called on Mr. Chew, and arranged with him for a meeting with their teacher. Mr. Tate drew up an outline of the organisation, a meeting was summoned, many names were secured as a start, then an inaugural meeting was held, a code of rules adopted, officers elected, and thus was launched the organisation which has called us here to-night, after a most successful career of almost thirty-eight years. Mr. Tate was a native of Alnwick, and was descended from an old Northumbrian family; his father was Mr. Thomas Tate, well known in England as the author of a number of educational works, and his uncle, Mr. George Tate, F.G.S., was a prominent North Country geologist, whose influence first incited his nephew to scientific studies. Professor Tate's early education was at Alnwick; subsequently he obtained a first-class scientific training at the School of Mines, South Kensington, and was sent out to several localities as a science teacher under the Department of Science and Art. During the three winter sessions in which he taught in Belfast, Lisburn, Carrickfergus, and elsewhere, there was quite a revival of the old scientific spirit which prevailed in the North of Ireland when our city was a comparatively unimportant town in other respects. Mr. Tate did not confine himself merely to the work for which he was paid, but engaged with a steady, quiet enthusiasm in an examination of the flora, fauna, and geology of the district. In 1863 he published his 'Flora Belfastiensis,' being an enumeration of the plants found within a radius of fifteen miles from Belfast. This was the first local flora produced in the North of Ireland. He also prepared a paper describing the Irish cretaceous beds, and figuring some of the new species of fossils he found therein. Then he explored the Irish liassic rocks, of which hitherto we knew but little, and his paper on this subject, communicated to our Club, and published in our "Proceedings," has remained

until now as the standard reference on these rocks as they occur in Ireland. Another paper, communicated to the Geological Society and published in their quarterly journal, dealt with the zone of *Ammonites angulatus*, a section of the lower lias. Let no one imagine that such papers as these are easy of accomplishment. They require long and patient work, combined with much insight derived from a previous knowledge of the rocks as they occur in other districts, such as very few possess. He also read a paper on the middle lias of County Antrim. Of this obscure subject nothing more is known at the present time. After Mr. Tate's engagement was ended here, he held an appointment as assistant secretary to the Geological Society of London, from thence he went to Central America as mining surveyor in Nicaragua. He paid considerable attention to terrestrial conchology while there, and published an account of the shells met with. A good collection of plants was also made, but, unfortunately, they were destroyed or rendered useless by damp during the rainy season of that country. Mr. Tate's stay in America was not long, and shortly after his return to London he was appointed to the Chair of Natural Science in the University of Adelaide, South Australia. This professorship he held until his decease. The wide field of research which Professor Tate now saw before him in a region where so much was almost virgin ground for the naturalist, must have been an intense stimulus to such a man. Here he set to work in earnest, and every year papers were produced dealing with some aspects either of the geology, botany, or conchology of the country. I have a list of eighty-five of these papers communicated to the Royal Society of Australia. This, however, only covers the period from 1881 until the present; further back I have not had access to the sources of information. Professor Tate succeeded in establishing a Naturalists' Field Club in Adelaide. He was its first President, and up to the close its most active supporter. He was President of the Australian Association for the Advancement of Science, when it met, eight years ago, in Adelaide. Australian science has suffered severe losses

during the last few years. Baron Von Mueller, a great friend of Professor Tate, and co-worker with him in several researches, pre-deceased him by about four years, and our own M'Coy, the veteran geologist, still more recently."

Mr. William Gray, M.R.I.A., proposed that a vote of condolence be passed to the surviving relatives of Professor Tate, and that a record of same be made in the minutes of the Club. This motion was seconded by Mr. Joseph Wright, F.G.S., and passed in silence.

"THE FRANCISCAN FRIARY OF KILLCONNELL IN THE COUNTY OF GALWAY."

The President then proceeded with his lecture, "The Franciscan Friary of Killconnell in the County of Galway." The lecture was admirably illustrated by numerous lantern slides and a number of "rubbings" of tombs and masons' marks.

Mr. Bigger said—Killconnell is perhaps the most perfect of the Franciscan houses at present remaining to us in Ireland, and was in use later than most others, being occupied and in good repair in the time of James I. At present the church nave and choir, side aisle and south transept, tower and side chapel are quite perfect, the doors and most of the windows equally so; large portions of the cloisters remain, and the same can be said of the domestic apartments. The glory of Killconnell, like that of Clare Galway in the same county, is its graceful tower, still as perfect as the day it left the builders' hands many centuries ago, an object of admiration for miles around, either in the broad glare of noon in a summer's day as it towers aloft into the azure sky, encircled by flocks of swallows or by cawing rooks, or brightened by the colours of the setting sun across the flat plain of Galway lying to the west. No matter when Killconnell is seen, or how it is approached, it appears, as Fergusson says, "more like a cloister in Sicily or Spain than anything in these islands;" it has a majesty and a beauty all its own, heightened by the

deep, religious calm which still seems to pervade its time-stained walls. Mellowed by the evening light or the haze of distance, we can scarce believe its holy occupants have vacated the shelter it so long afforded them, and for the time we fail to remember that Sir Richard Bingham and his rude Elizabethan soldiery, their horses and their guns, were stabled within its sanctuary. Then the end came and the friars were driven to the bogs; the bells had sounded their last "angelus" and the roofs had fallen in, exposing to time's devastation some of the richest and rarest of man's handiwork, dedicated to God's glory and the beauty of His house by the piety of those who had long been laid to rest within its sacred walls in the fond hope that His sanctuary should ever be preserved by pious hands throughout the coming ages. Vain hope, indeed; what man had reared man has destroyed. The church originally consisted of a nave and choir, a short south aisle and a south transept being subsequently added, the aisle being continued along the west side of this transept and an eastern chapel added to it called the O'Donnellan Chapel. At the junction of the transept with the nave the tower rises, and it, too, as is evident from the masonry, was added at a later date. The cloisters lie on the north side of the church, and the domestic apartments range along their eastern side. A cloistered porch with an upper chamber rests against the north wall of the tower in the cloister garth, and from it a doorway opens on the circular stairs which lead to the tower. Along the cloister side of the north wall of the choir there is a passage and a slype leading to the chamber now occupied by the tomb of Baron Trimblestone. From the south wall of the choir at the east end, built at right angles, is a chamber, with a built-up south window, which may have been a sacristy—it is the most modern of all the buildings, with no features of interest, and at present is filled with loose carved stones from the Abbey. Two semi-circular arches connect the nave with the south aisle, and two arches of a similar class, of unequal size however, are continued along the west side of the transept, ending in a very beautiful two-light

decorated flamboyant south window. The east wall of this transept has three arches of different sizes. There is a small narrow window high up in the west wall of the south aisle and there was a large one below, now built up. The mouldings on the pillars of the arches are small and finely cut, not deep and bold. The transept and its accessories are puzzling in some ways, and must have been altered at different times. It is lighted by a well-proportioned three-light south window, the wall underneath, as I have mentioned, being arched by three deep roughly-built recesses, the centre one bing flattened on the arch for the window, which may have had some ecclesiastical use, as well as affording additional strength to the gable. The east wall of the transept was originally triple-arched in an unusual manner, and evidently lighted for three altars, the centre arch being opened up at a later date, and the chapel built. On the south wall of this chapel there is a very fine double piscina of a late date still in perfect preservation, which bears out the idea that this chapel was specially built by a benefactor. In the same chapel is a square-headed two-light south window with external rose ornament, and a large east window with two corbels on the north side of it projecting into the chapel. In the jamb of the adjoining arch in the transept is another piscina with the unusual feature of two openings to the front and one into the side of the arch. The work of the whole is plainer, however, than that in the chapel. In the nave is a three-light west window over the door, the latter being rather small but deeply splayed, the thickness of the wall, 3 feet 6 inches, and the outside batter allowing of this. It is pointed outside with heavy cover moulding and flat headed masonry inside. In the north jamb, on the inside, let into the wall, there is a double arched holy water stoup, one arch into the nave and one into the jamb of the door. There was a narrow pointed south door opening direct into the nave—the aisle not extending the full length of the nave—close to the west wall and now built up flat inside, but the arch is still to be seen on the outside. Two double-light flat arched windows (one now built up) light the

south aisle; an arch sprang from the corner of the external wall of this aisle to the tower. The choir has been altered at several periods, especially in the south wall. The east window is four-light of a plain design of frequent occurrence, similar to the west and south transept windows. Originally three large windows were equally spaced in the south side, only the centre one now remains, that to the east having been built up when the more recent sacristy was added—at first this chamber was connected with the choir by a low arch and it again was built up, and now only a small pointed door remains. These three alterations are clearly traceable in the masonry. The window to the west was built up when a gallery was added around the choir and a newer window made at a higher level. On the north side two similar windows were made at the same high level to suit this addition. The corbels which supported this wooden gallery, which extended half way from the tower to the east wall, still remain to prove its existence, as do the corbels on each side beneath the tower, where a gallery or rood screen ran across, which was approached by a door from the circular stairs ascending from the cloister in the north side of the tower. This also gave access to the choir gallery. It is not clear why this gallery was erected in the choir, as it could not be approached from the dormitories direct to save the friars at night from descending to the ground floor, as its only approach was by the tower stair which ascended from the cloister. It certainly provided more accommodation on what is considered a very modern and inelegant plan, but at the same time it would be a great disfigurement to a gracefully proportioned building. There are doors on each side into the choir, close to the tower, the one on the north side from the cloisters being the older. Half way along the north wall there is a very low door, which may have been the guardian's door leading to what I have conjectured to be the guardian's apartments. East of this door was probably a window, now broken down. There is a corbel on the level of the sill of the east window on the north side, but no ambry or piscina. The tower is the finest and best

built portion of the whole Friary, cut stone being used freely in its construction. It is clearly of a later date than the church, as can be seen by the intrusion of its masonry into the side walls. The arches are bold, lofty, and graceful, that into the transept being much lower than those rising east and west. Above the arches the sides of the tower diminish roof-shaped into the tower proper; this on the north side gives ample space for the ascending stairs to the rood screen and the small chamber above the cloister porch. The stone groining is still perfect, of a lovely plain design and excellent workmanship, showing bell-rope apertures. Three of the corbels supporting the arches are plain with a little ornament on the mouldings; the one to the south-west shows a well carved wing figure holding a shield. A similar figure adorns one of the corbels supporting the tower arch opening into the transept. The north wall of the tower has a small square opening into the stairs at floor level and about seven feet from the ground an oblong ope which on the other side of the wall is continued right through the stairs, thus giving a view of the church without entering into it. About twenty feet from the ground is the entrance door on to the screen already referred to. The first floor of the tower above the arches is lighted east and west by two-light square-headed windows and single windows to the south and north, the second floor by a single west-window and a two-light south-window, and the third by two-light windows on the east, south, and west, and a single window to the north. The surmounting battlements are well proportioned, and in perfect order. Heavy flag-stones are built into the walls where the roofs of the church joined the tower. The cloisters are perfect on the eastern side of the garth and at the north side of the tower, where, porch-like, they extend into the square, being surmounted by a small chamber reached from the tower stairs. The northern and western sides have disappeared to the foundations, but many of their arch stones are still lying about or temporarily erected on the foundations. Along the north wall of the choir from this porch there was a walk to a flight

of steps leading down to a square apartment described by some as the strangers' house, but which was most probably the guardians' apartments. It is lighted by two-light square windows east and south; in it is the tomb of Baron Trimblestone. Above this chamber was another with four small square windows to the east and a three-light window to the south, all being perfect. Further north from this chamber is a larger apartment with dormitories above, and still further north other buildings; the most northern, by reason of its outside door, was probably the strangers' house or perhaps a granary. About fifty paces north of this is Lantera's well which still has a copious supply of water used by the modern village. A most remarkable feature of the carved stones of the cloisters is the number and variety of the masons' marks which appear; nearly every stone has such a record, and I rubbed copies of all I saw, though many of them are repeated time after time—many have the "fleur-de-lys" shape, clearly denoting their French origin. Other patterns may be found by a more prolonged search, not that they were concealed in any way—many of them appear on the most noticeable portions of the masonry. The monuments, many rich and varied, were then described in detail, and all the known historical references to Killconnell quoted.

The paper was exhaustively illustrated by lantern slides from photographs taken by the Baron Clonbrock and Mr. R. Welch, with plans and drawings supplied by Mr. W. J. Fennell. Some of the remarks in the lecture gave rise to considerable discussion as to the want of respect for the dead that was common in Ireland. In this discussion Messrs. J. M. Dickson, W. J. Fennell, Wm. Gray, Wm. Swanston, and W. H. Hancock took part.

"THE BRITISH ASSOCIATION, ITS OBJECTS AND WORKINGS."

The second meeting of the Winter Session was held on 11th December, the chair being occupied by Mr. J. Vinycomb,

M.R.I.A., when Mr. Wm. Gray, M.R.I.A., delivered an address on "The British Association, its Objects and Workings."

Mr. Gray said—About the commencement of the second quarter of the last century there prevailed in these kingdoms and the Continent a growing desire to elevate and extend popular education, and the more systematic investigation of natural and physical science, and to apply its results to meet daily wants, increase material comforts, and extend commercial prosperity. The Royal Society, the premier scientific society of the world, was founded 170 years before. The Society of Arts was founded in 1754, the Royal Irish Academy in 1786, and many other large metropolitan societies were already established, but minor societies were being formed in several centres of industry. In this movement Belfast took a prominent and very worthy place. The Royal Academical Institution was in operation, the Botanic Gardens were established, and the Natural History and Philosophical Society, founded in 1821, projected the building of the Museum, which was creditably opened, free of debt, in 1834. In 1831, the Irish National Education System was created, and was far in advance of anything previously attempted in Great Britain or Ireland. It possessed many elements of very great promise, but subsequent unhappy circumstances hindered their development. The system is now far in the wake of the educational systems of the sister kingdoms. In 1823 there was founded in Germany a peripatetic congress of scientists, which met annually at one of the many centres of learning in that country. Even at that period the educationalists of these countries were as disposed to follow Germany in educational matters as they aim at doing now with reference to the promotion of technical instruction, and hence Sir David Brewster, Sir Roderick Murchison, Sir John Herschel, and other prominent scientists suggested the idea of forming a similar association in England, which should meet annually at some educational or industrial centre throughout the kingdom. The first practical step taken to give effect to this project was a letter written by Sir

David Brewster to Professor John Phillips, the geologist, who was then Secretary to the Yorkshire Philosophical Society. As the result of this communication, the first scientific Parliament of Great Britain, the British Association for the Advancement of Science, was held in York in 1831, under the presidency of Lord Fitzwilliam. At first the Universities gave the movement a hesitating support, but the policy of the promoters in visiting successively for the following four years Oxford, Cambridge, Edinburgh, and Dublin removed all doubts, and the success of the Association was assured. Since its establishment in 1831, or a period of seventy years, the British Association has held 71 annual meetings—47 at 23 English centres, 11 at 4 Scotch centres, 6 at 3 Irish centres, 3 at 2 Welsh centres, and 2 at 2 Canadian centres. The place of meeting, date, and President of each of the six Irish meetings are as follow:—Dublin, 1835, the Rev. Provost Lloyd, LL.D.; Cork, 1843, the Earl of Rosse, F.R.S.; Belfast, 1852, Lieutenant-General Sabine, F.R.S.; Dublin, 1857, the Rev. Humphrey Lloyde, D.D.; Belfast, 1874, Professor J. Tyndall, LL.D., F.R.S.; Dublin, 1878, W. Spottiswood, M.A., F.R.S. The objects of the Association, as arranged at the first meeting in York, 1831, are still the same, namely:—"To give a stronger impulse and a more systematic direction to scientific inquiry; to promote the intercourse of those who cultivate science in different parts of the British Empire, with one another, and with foreign philosophers; to obtain a more general attention to the objects of science, and a removal of any disadvantages of a public kind which impede its progress." Now, when we consider that during the week the meeting is held the number of reports and papers submitted for discussion on every question of scientific interest is between three and four hundred, we can understand why it has been found absolutely necessary to allocate them to separate Sections, each Section having its own President, Vice-Presidents, and Secretaries, thus enabling the Association "to give a more systematic direction to scientific inquiry." The following are the Sections now in operation, with the respective dates and

place of formation:—A, Mathematical and Physical Science, Oxford, 1832; B, Chemistry, Oxford, 1832; C, Geology, Oxford, 1832; D, Zoology, Oxford, 1832; E, Geography, Ipswich, 1851; F, Economic Science and Statistics, Cambridge, 1833; G, Mechanical Science, Bristol, 1836; H, Anthropology, Montreal, 1884; K, Botany, Ipswich, 1895; L, Education, Glasgow, 1901. In order that the Association might keep in touch with provincial scientific societies, qualified to further the objects of the Association, there has been held at the annual meetings for some years past, a conference of delegates of corresponding societies, which is conducted by a committee nominated by the Council and elected by the General Committee. Any society is eligible to be placed on the list of corresponding societies if it undertakes local scientific investigations and publishes the results. The Belfast Naturalists' Field Club and the Belfast Natural History and Philosophical Society are the only Corresponding Societies listed from Ireland. A Corresponding Society has the right to nominate a member, who is also a member of the Association, as its delegate, and such delegate becomes, for the time being, a member of the General Committee. The lecturer then described in graphic terms the various meetings held by the Association at its annual gathering.

Mr. W. J. Fennell afterwards exhibited and explained a number of the photographs taken in the vicinity of Glasgow during the British Association week. Some new members having been elected, the proceedings terminated.

"HOW CAN THE MUNICIPAL TECHNICAL INSTITUTE AID THE PROGRESS OF NATURAL SCIENCE?"

The Club held the third meeting of the Winter Session on the evening of the 17th December, when Mr. Fras. C. Forth, A.R.C.Sc.I., delivered an address on "How can the Municipal Technical Institute aid the progress of Natural Science?" He chose that subject as the most likely to be of interest to the

members, as he was sure they would be desirous of knowing in what way their wants were being catered for by the new Technical Institute. In the first place it would be well to get a clear idea of what he proposed to deal with, and accordingly he defined the branches of Science that came under the respective heads of Natural Science and Physical Science. He did not propose to address them as a stranger to Field Clubs and their working; he had in former times been a member of Field Clubs in other centres, and was, therefore, conversant with their strength and weakness. His first observation was that the members might be divided into two classes—the systematic workers and the dilletantes. The systematists collected facts, carefully labelled and pigeon-holed them in a properly prepared mind, where one fact had its due relation with respect to all the others—they had set their houses in order and knew where to find a fact when wanted. The dilletantes also collected facts, but instead of pigeon-holing them in order, piled them up one on another in a disorderly heap, producing a chaotic mass, and when one fact was wanted the whole pile had to be disturbed in order to get it. The result was that the systematic student could compare each fact or observation with neighbouring ones, generalise, draw conclusions, deduce theories, in short, pursue scientific methods of study and investigation. Without a systematic knowledge or preliminary training, the student is in the position of the unskilled practitioner, one who can examine facts but cannot interpret their meanings. To the logical mind, a framework on which to build is most helpful to study, and aids not only the retention of knowledge but also in the ease with which such knowledge can be acquired and secured. Extracts from Huxley were read on improving natural knowledge, on a liberal education, on scientific education, and on the educational value of the natural history sciences. It was often stated that the knowledge of natural science was of little use to man in that it did not supply him with the means of making money. Judged from this standpoint it might be of little use, perhaps; this, however, was a low standpoint. It

was such study that led Harvey to the discovery of the circulation of the blood, which had resulted in such inestimable blessings to mankind. Other examples of like nature might be cited. The Field Club was a place where papers were read at times in which terms were used that were often unintelligible to the average member. In field excursions objects were pointed out and a name given to them; often the lecturer took for granted that his hearers understood the terms he used, and did not explain them as they arose, and he was convinced that often the members did not understand the terms used or the bearings and relations of the objects to other objects in nature. The scientific terms were a kind of shorthand introduced in the midst of common writing—they were full of meaning, but if the terms were not understood then the meaning of the discourse or paper would be lost. In the classes of the Technical Institute these terms were explained with their use and value; so explained that they could be systematically labelled as the pigeon-holes in which to store in an orderly manner subsequent observations. By this means the relation of each branch of science to the whole structure and the detailed study of each branch itself can be carefully gone into. The Institute can supply the theory and the Club the practice. Progress can also be tested by means of properly conducted examinations. While the lecturer so strongly advocated the systematic study of nature, he had no intention to decry the unsystematic study of natural science; better to study in that way than not to study at all. Get a knowledge of natural science, get it thoroughly if you can, but *get* it.

A discussion was invited on the address, and the following members took part:—Messrs. C. M. Cunningham, R. Welch, Adam Speers, B.Sc.; A. Milligan, R. May, John Hamilton, J. St. J. Phillips, and the chairman, Mr. William Gray, M.R.I.A. None of the speakers took exception to any part of Mr. Forth's address, which dealt with the general principle rather than with the detailed methods of teaching to be adopted in any of the branches of science.

Before the meeting a number of members assembled for the usual "Half-hour Science Gossip." Mr. Cunningham exhibited an abnormality in the dentition of a human skull brought from the Seychelles Islands, while many other members exhibited objects of interest.

SHORT PAPERS.

The fourth meeting of the Winter Session was held on the 21st January, when a number of short papers were brought before the members on a variety of topics. Mr. W. H. Phillips presided.

Mr. George E. Reilly dealt with "Some recent discoveries at the crannoges of Lough Mourne." In a brief outline he described the investigations that were conducted by some members of the Club in former years, a record of which is to be found in their Proceedings. This he supplemented by describing discoveries made during the past two years, when many objects of antiquarian interest were recovered from the bed of the lough. Some of these objects Mr. Reilly produced for examination, while drawings of others were shown. These objects consisted of a bronze pin with Celtic ornament, a twisted handle, a wrought fishhook, specimens of pottery, including fragments of a large crucible, sinking stones, a rough stone axe, and others. The paper gave rise to a short discussion, in which Mr. Gray and Mr. Swanston took part.

The second paper was by Miss M. K. Andrews, dealing with encroachment of the sea on the land. This paper was illustrated by some excellent lantern slides. The first view was of Fair Head, in County Antrim. Its vertical face has been determined by the structure of the dolerite, which has yielded along the vertical division planes. The shores of Colliery Bay show an excellent example of a plain of marine denudation—a smooth platform of rock reduced to average tide level by the action of the sea and by atmospheric waste. A series of slides was shown in which the genesis of sea-stacks could be traced from the cleft in the rock, which the sea enlarged into a cave or natural arch. The work was then taken up by atmospheric

agencies, and the crown of the arch ultimately disappeared, leaving the sea-stack or pillar. Encroachments of the sea had taken place even in historic times. The site of ancient Cromer is under sea. Ravenspur, where Henry III. landed in 1399, has completely disappeared. Old maps also record the names of many other places "washed away by the sea" and tracts of land now entirely submerged. Coming to our immediate locality, the County Down coast, photographs were shown of Black Island, Newcastle. This is now a band of wrack-covered boulders, exposed at low tides, occupied but a century ago by houses and gardens, a sea embankment protecting the site on the west. The present sea wall is over 300 feet behind the ancient wall. Encroachments at Cultra were also described. Reference was made to the work done by the Committee of the British Association in 1895. The Committee considered that the information laid before them was amply sufficient to show the imperial necessity for preserving in an efficient manner the area of the country from inroads of the sea. It proved that the work of devastation had been largely aided by the abstraction and selling of shingle, sand and cement, stones and other rocks, and by the incorrect designs and foundations of many preservation works.

Miss Walkington, LL.D., then gave an account of the district between Newtownards and Knock. Many of the places described are little known, but on account of their beauty or historic interest are worthy of a visit.

Mr. James Orr read a short paper on "Sea Urchins," illustrated by lantern slides, in which he said that they are near relatives of the star-fishes, but differ chiefly from them in the fact that they have a shell, which is made up of polygonal plates, in most cases fixed together by their edges, and covered with spines. In a regular urchin the shell may be divided into three parts—1st, the apical disc; 2nd, a series of plates surrounding the mouth; and 3rd, the remainder of the test termed the corona. The plates of the corona are of two kinds, ambulacral and interambulacral, and are arranged in alternate areas extending from the apical disc, which is on

the summit of the test, to near the mouth, which is opposite to it. The masticating apparatus of some urchins is very complicated, and is commonly known as Aristotle's Lantern. The teeth are constantly growing to make up for wear. Other urchins have no teeth at all, but instead have the mouth produced into a tube, by means of which they burrow in the sand, in which they live and from which they extract what nutriment they can. The organs of locomotion are tube feet; these are furnished with sucking discs, and the urchin is able, by attaching them to some object, to pull itself forward. Progression is sometimes made by the urchin rolling over and over, fresh relays of tube feet coming into action all the time. A few species of urchin are able, for their protection, to excavate hollows in the solid rock. A well-known example of this is *Strongylocentrotus lividus*, an inhabitant of the rock-pools at Bundoran and other places on the West Coast of Ireland. They are mostly associated with a coralline, which covers the rock in the space between the burrows, sometimes to a height of $1\frac{1}{2}$ inches, and often makes the urchin a prisoner in its own house, growing partly over the holes. Sea urchins are of great geologic age, being found in the Ordovician rocks in Russia. They were very abundant in Jurassic and Cretaceous times, thirty genera being known from the latter system. Some of these genera, such as *Cidaris*, still inhabit our seas.

The next paper was by Mr. Nevin H. Foster on "Feathers." After some introductory remarks, Mr. Foster explained that feathers are not distributed over a bird's body in the same way as are the hairs on mammals. The hairs of a horse are set closely together all over the body, whereas the feathers of a bird are restricted to certain well defined tracts, with bare spaces of naked skin between. The body is only concealed from view because the feathers are long and broad, and are so directed as to slope away from a line drawn through the middle of any given tract. These tracts—discovered sixty years ago by a German ornithologist named Nitzsch—and the regular nature of their distribution over the body have led to

the science of pterylography, by which experts can tell at once to what group any particular bird belongs, and often even to which species. Mr. Foster then described the structure of a feather, the strong central shaft of a "quill" feather, along each side of which are hundreds of little straight branches set very close together, usually called a web. Along each of these branches there are other little branches called barbules, the larger ones being known as barbs. Half of the barbules have inturned edges, whilst the other half have long and delicate hooklets, which seize the inturned edges and hold them fast. Thus it is difficult to pull the web apart, as the small hooklets have to be pulled away from the inturned edges next the barbule. It is to this power of resistance that birds owe their powers of flight, to a large extent. Flightless birds, such as the ostrich, have no hooklets, and so their feathers cannot form a web. To give an idea of the number of barbules, on a piece of the web about 15 inches long of a crane's quill feather there were counted no less than 650 barbs, each one of which bore about 600 pairs of barbules—that is almost 800,000 barbules for the inner web alone of a single feather. Mr. Foster concluded an interesting paper by describing the process of moulting, and appealed to the ladies to help the preservation of rare birds by refusing to wear feathers in any form. The paper was illustrated by lantern slides showing structure of feathers.

Mr. Robert Welch then exhibited a large number of views of different subjects, giving a short description of each. Several slides were shown illustrating the living fishing line, *Lineus marinus*, which may be found on almost any of our shores, coiled up under stones between tides into what seems a veritable tangle. This worm, on uncoiling, seems able to stretch itself almost indefinitely, hence the incredulity expressed even by well-known naturalists, who should have known better, when the Rev. Hugh Davis described it in the Linnean Society's Transactions many years ago. Gosse, Chas. Kingsley, and others also had to defend themselves from the charge of "drawing the long bow." Kingsley retorted on his

critics that there was so much in nature that was truly marvellous that it was unnecessary for an author to invent lies to startle his readers. The worm of a fair length may be found threaded through the hollow spaces in the coralline (*Lithothamnion*) growths that line the rock-pools of Bundoran, the Island of Inishmurry, and other parts of Donegal Bay, but it is almost impossible to get it out unbroken. It may seem strange that a rock-pool only a few feet wide should be a favourite habitat of an animal that sometimes grows twice as long as the great Rorqual, the largest of our whales (which sometimes measures 90 feet). Yet the Long Worm has been described by Professor MacIntosh in his monograph of the British Annelids as being washed ashore at St. Andrews after a storm in an unbroken mass that half-filled a dissecting jar 8 inches wide and 5 inches deep. Thirty yards of this were measured without a rupture, and yet the greater part of it was not uncoiled. It must have measured over 180 feet in all.

Mr. Welch described briefly the large heavy sub-fossil *Helix nemoralis*, found in a land-shell deposit at Dog's Bay, Connemara, some of which weigh from 75 to 110 grains each, while the species now living there are distinctly smaller and much thinner, weighing only from 5 to 15 grains each when adult. A somewhat parallel case to this was cited and slides shown of the extremely thick and heavy *Placostylus senilis* which forms a deposit in the Isle of Pines, New Caledonia. Here the shells occur in a matrix of coral sand resting on coral rock, and only covered by a thin layer of earth. The shells are so plentiful that they are quarried out by the natives and burned for lime. The species now living on the island is both smaller and very much thinner and lighter. *P. fibratus* would probably most closely resemble the extinct species. A number of the shells themselves of several species were exhibited, including a very rare *Placostylus* of a vivid green colour, which is only found, as a rule, when it falls out of the trees—a nice example of protective colouring. The natives have a habit of collecting these and carrying them about until they can deposit them at certain sacred places.

He also exhibited some slides of nightjars' nesting-places, eggs, and young just hatched, glacial erratics, and tally sticks, explaining that the latter, still surviving in some parts of Ireland, including a district along the Lower Bann, were used very extensively by both bakers and brewers in England till very recent years, and that the Government kept the records of elections of members of Parliament and accounts of the Court of Exchequer on tally sticks till about the year 1826. The burning of the old Houses of Parliament is thought to have been caused by the panelling taking fire in the House of Lords from the heat given out by these old records when used as fuel in the heating stove.

The concluding paper was by Mr. W. A. Green, explaining the introduction of foreign *mollusca* into this country. Bananas imported from the Canary Islands afford a safe shelter for several species of shells, and occasionally spiders are found when the bunches are opened up. A beautiful little beetle occurs on Californian apples, whilst in currants, raisins, flaxseed, and other imports, shells are sometimes found indigenous to the exporting countries—the Greek Islands, Turkey in Europe and Turkey in Asia. An excellent photograph by Mr. R. Welch illustrated the machinery used by Messrs. Forster Green & Co. in cleaning and washing imported currants, by means of which sand, stones, footstalks, and other foreign material are effectually separated from the fruit. The lily tanks of the Dublin Botanic Gardens also afforded a striking proof of the introduction of *mollusca* on the stems of various tropical lilies.

The election of three new members brought the meeting to a close.

"THE TEETH OF VERTEBRATES."

The fifth meeting of the Winter Session was held on 18th February, when Mr. Charles M. Cunningham, D.D.S., L.D.S., read an interesting paper on "The Teeth of Vertebrates." Previous to the formal meeting, the usual "Science

Gossip Half-hour" occupied the members' attention, various objects of interest being exhibited and discussed. At eight o'clock the chair was taken by Mr. William Gray, M.R.I.A., who opened the proceedings by referring in feeling terms to the loss the community had sustained by the death of the Marquis of Dufferin and Ava. His Lordship was one of the three Honorary Members of the Club, and Mr. Gray proposed that the respectful sympathy of the members should be conveyed to the Marchioness of Dufferin and her family. The resolution was seconded by Mr. John M. Dickson, supported by Mr. John Vinycomb, M.R.I.A., and passed by all present standing in solemn silence.

Mr. Cunningham then proceeded with his lecture on "The Teeth of Vertebrates." He began by pointing out the impirtant part which teeth had played in the identification of extinct animals, their extreme hardness rendering them more indestructible than other tissues. Primitive forms of teeth were then described, and the lecturer explained the difference between horny teeth and true teeth, emphasising the necessity of regarding dentine as the essential element in the latter. By the aid of appropriate illustrations thrown on the screen, he showed the dermal origin of teeth, and how horns, hoofs, hair, and teeth have come to be classed as parts of the dermo-skeleton of animals. Then followed an interesting series of illustrations showing peculiar features in the teeth of fishes; the serried rows of teeth in the sharks, the hinged teeth of the hake, the palatine, vomer, and throat teeth of other fishes, and the remarkable teeth on the "saw" of the sawfish. An account was then given of the teeth of reptiles, proving their primitive type, and the working of the wonderful poison-apparatus of the rattlesnake was described in all its important details, showing it to be a highly-specialised weapon. After pointing out the difference between the homodont dentition of reptiles, and the heterodont dentition of mammals, the lecturer described the teeth of herbivores at some length, and laid special stress upon the correlation of growth shown in the ruminants by the curious

relation between the canine teeth and horns. For instance, deer which have powerful horns have no canine teeth, whereas deer which are hornless, such as the musk deer, have well-developed and powerful canine teeth. Nature thus compensates the musk deer for the want of one form of weapon by giving it another. Teeth of continuous growth were treated with some detail, illustrations being furnished by the swine, the rodents, and the elephants. In connection with the latter an interesting specimen was shown of an iron musket-ball embedded in the centre of a tusk. The ball had evidently struck the elephant in the root or pulp of the tusk, and by its growth the ball had been slowly carried down the centre of the ivory, where it was accidentally found when the tusk was being cut up. After mentioning the powerful teeth of the carnivores, especially the scissor-like action of the tiger's jaws, the lecturer concluded with a reference to the remarkable dentition of the kangaroo. The lecture was illustrated by over fifty specially-prepared lantern slides and a large series of typical skulls and teeth. After some discussion, in which Mr. Gray and Mr. Welch took part, the audience came forward to examine the examples on the table, and Mr. Cunningham was occupied for some time answering the various questions put to him and explaining obscure points. It was quite a late hour when an interesting and most instructive meeting came to a close.

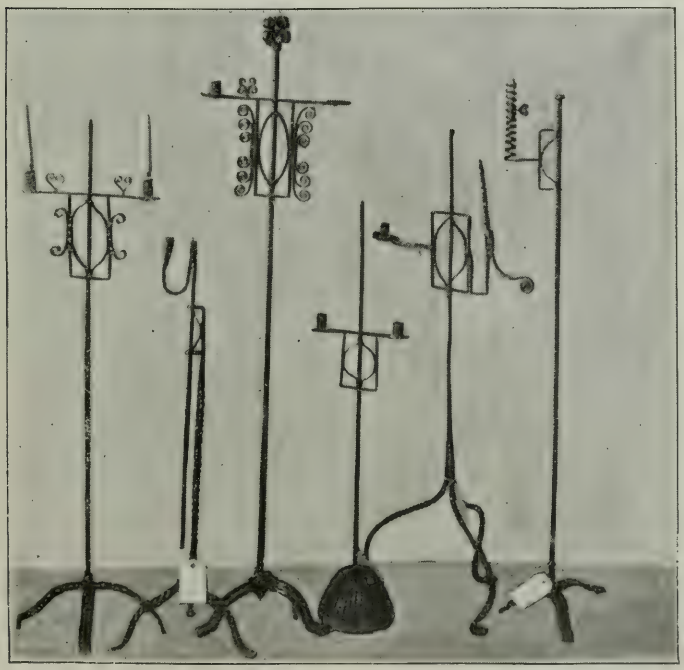
"OLD ULSTER IRON RUSH-LIGHT CANDLESTICKS AND CRUISIES, AND OTHER ALLIED OBJECTS."

The sixth meeting of the Winter Session was held on 18th March, when Mr. Robert May read a paper on "Old Ulster Iron Rush-light Candlesticks and Cruisies, and other allied objects." Mr. John Vinycomb, M.R.I.A., occupied the chair.

Mr. May said—The sun is, as it ever was, the light and glory of the world. Its soul-inspiring and health-giving rays descend as liberally on the thatched cottages of the peasantry as on the gilded domes of the mansions of the rich. It might

seem a long step from its ever-welcome light to the concentrated flicker of a farthing rush-light, yet such was the substitute used by the majority of the peasantry when they desired either for work or pleasure "to steal a few hours from the night." In preparing this paper I made an effort to procure as much literature as possible on the subject of rush-light candlesticks, as it is now about half a century since they were in common use, though isolated cases occur in Co. Antrim, and no doubt in other districts, where they are still in use. I saw one in use in Co. Antrim about two months ago. So the last embers of the rush-light are dying in the full glare of the electric light. As there is little printed matter on the subject I procured as many specimens as I could, together with as much information as I could get from old inhabitants who remembered them in use. It may seem a misnomer to call an iron stand a "candlestick," but common usage has made the term acceptable, for even in the Holy Scripture candle and lamp supports which were made of the precious metals are spoken of as candlesticks. No doubt the term originated from the fact that the earliest specimens were made of wood. In a paper read before the members of the Royal Irish Academy in 1891, by the Rev. J. F. M. Ffrench, F.R.S.A.I., on "A manner of lighting houses in old times," a description is given (by a County Carlow man, then over eighty years of age) of a candlestick of a type which was old when he was young. A wooden shaft the size of an ordinary spade-handle, let into a solid block, with a hole cut in an upright piece to contain a candle, and a piece of wood at right angles with a notch for rush-lights. The Rev. Mr. Ffrench says: "It must have been a candlestick such as this which the Hon. Emily Lawless describes as having been found in a Kerry bog under sixteen feet of peat." He also says: "The earliest mention I have been able to find of the preparation of rushes for lighting purposes is in a pretty story in the life of Cormac MacArt, King of Ireland, about the year A.D. 200 or 227. The story, as related by Keating and others, tells us that Cormac, riding through a wood, came suddenly upon





Old Ulster Iron Rush-light Candlesticks and Cruisies.

[Photo by J. St. J. Phillips.



a fair damsel who was engaged in her household avocations of milking, drawing water, and cutting rushes with a sharp hook, the long green ones suitable for lighting purposes, and the others for strewing the floor. One version of the story tells us that when he revealed himself to her and questioned her about cutting the rushes, she told him that it was the work of the women to cut and peel the rushes, as women are the light of the house. Captivated by her beauty and her aptitude for house-keeping, he made her his Queen." After that story I think that those who still have specimens of the rush-light candlesticks should not be ashamed to own them, for too often when making enquiries for them at farm houses you are told, "Oh, yes, we had one, but threw it out. What use was it?" Many fine specimens have been sent to Belfast from the surrounding country towns as scrap iron and shipped away as such. Three years ago I exhibited several specimens at a local loan collection of antiquities, etc., and it was with surprise and pleasure I saw quite a number of visitors gather round the pieces of rusty iron, for they brought back to the memory of many of those present happy evenings and nights spent round the great peat fires in the country, for there the possession of a few pounds more or less does not form such a barrier to social intercourse as it does in the town or city, for the squire enjoys dropping in to hear the village politician or the good story-teller. The iron candlestick must, of course, be chiefly identified with the peasantry, though the more ornamental specimens had evidently been made for tradesmen and well-to-do farmers. Great numbers of these must have been made in Ulster during the eighteenth and the beginning of the nineteenth century. The general construction of the majority of the specimens that I show is very similar to the tripod lamp-stands found at Pompeii. But the Ulster artificers were evidently no servile imitators, for rarely do you find two specimens alike. Some have only the necessary parts required for their utility, while others with a very little additional ornament display a thorough knowledge by the maker of what is beautiful yet simple. Mr. William

Gray, M.R.I.A., remembers, when a boy in the South of Ireland, that wooden candlesticks were made by choosing a piece of fir which had three branches growing from the straight stem; it was cut about nine inches in length, a tin socket was fixed on the top, the three branches forming the feet. It is very evident by the abundance of long specimens in Ulster that they are a distinct type from the southern. In a paper on "Rush-light Candlesticks" by Col. P. D. Vigors, F.R.S.A.I., published in the Journal of the Royal Society of Antiquaries, 1891, with plate illustrating eight specimens, six of which are short, averaging about twelve inches, and principally for use on table or mantel shelf, the writer mentions that "The southern type is invariably about ten or twelve inches in height." He kindly informed me in a letter "that he had seen a collection in Galway of thirty or more, principally short specimens, and that in the south long specimens were seldom seen." There is no doubt that the linen and flax industry in Ulster is accountable for this long type, ranging from two feet six inches to five feet. They were extensively used at the spinning-wheel, and by a sliding arrangement with a spring they could be adjusted by the spinner to the desired height. Smiths and shoemakers also used them all over Ulster. Many of the larger specimens were made for holding resin-slits. The majority of the Ulster rush-light and resin-slit stands have also a socket for a candle and in many cases two sockets. The candles were mostly home-made tallow dips. Bog deal was very often used in the form of splits. In Ulster the weavers' candlesticks were very numerous; they mostly consisted of a single socket at the bottom of a thin iron rod with hook on top for suspending from a nail or line. An excellent paper was read on that subject by the Rev. G. Buick, of Broughshane. Specimens of these, some of which I show, are still to be picked up in this locality. Around Connor the farmers and weavers, after making resin-slits (which were made by rolling tow or flax and sometimes cotton rags in the melted resin), just heated the end and stuck them on a wall. This is a form of candlestick I have not added to my collec-

tion. I show a specimen of the *Cam*, a vessel in which the tallow was melted for the rush-lights and the resin for the slits. *Cam* is an Irish word, meaning crooked, and this vessel answers to the description. The rush is prepared by stripping most of the skin off, just leaving a thin rib on, and drawing it several times through the melted tallow, sometimes tallow and bees' wax, or tallow and resin. A well prepared rush will burn for about three-quarters of an hour. About Doagh and Ballyclare they had a saying when the rush was burning too near the iron, "It is time you were flitting the goat." Eliza Cook devotes a poem of eight verses to the song of the rush-light. I shall, with your permission, read the first verse—

"O! scorn me not as a fameless thing,
Nor turn with contempt from the lay I sing;
'Tis true I am not suffered to be
On the ringing board of a wassail glee,
My sickly beam must never fall
In the gay saloon or lordly hall,
Yet many a tale does the rush-light know,
Of secret sorrow and lonely woe."

The Rev. Gilbert White, in his ever popular Natural History of Selborne, devotes a long and interesting letter to the preparation of rushes for lighting purposes. The method of procuring a light is a subject for a paper in itself, and several learned and scientific papers have been devoted to it. Charles M. Tidy, M.D., F.C.S., in the "Romance of Science Series," has written a small volume on the story of a Tinder Box. A local antiquary, the late Mr. W. Bell, in 1881 wrote an excellent and humorous paper on "Recollections of Matches and Matchmaking Fifty Years Ago," and by the kindness of his son, Mr. James Bell, I am enabled to demonstrate the method of procuring a light by putting the sulphur-tipped match into the live tinder in this tinder box, which he used to illustrate his paper. This piston or fire-syringe was also made for his paper, similar to those he remembered in use. The heat is procured in this by compressed air, which lights

the tinder or touch-paper. Dr. Tidy remarks: "It is well known that the tinder box was in use long before the age of printing, and though phosphorus was discovered in 1669 by Brandt, an alchemist, it was not until 1833 that phosphorus matches became a commercial success." Regarding local history or reference to rush-light candlesticks, I have not been able to get much information. I have here a very old specimen of a local pocket tinder-box with small candle in it. In August, 1804, an advertisement announcing the important engagement of George Frederick Cooke at the Belfast Theatre, mentions that the prices are raised, and that the house will be illuminated by wax candles in lieu of the old tallow dips. Gas was first used in Belfast Theatre on January 27th, 1824—two years preceeding Bowery Theatre, New York, though later than in some English theatres. Benn, in his "History of Belfast," says: "The lights must have been very bad in 1785, as in that year an order was issued directing the inhabitants, when an alarm of fire was raised, to place candles in their windows to guide the steps of those who were running to extinguish the flames." The late Rev. C. H. Spurgeon delivered two very humorous lectures on candles, in which many interesting items occur. In defining a candle he quotes the Century Dictionary, which describes it as "a taper, a cylindrical body of tallow, wax, spermacetti, etc." Spurgeon says: "This is all very well, but how much more we might have known if the lexicographer had called a candle 'Nacent possibilities of illumination materialized in oleaginous cylindrical form.'"

I now come to an important method of lighting, which in Ireland is principally confined to the north-east portion and adjacent islands. The Cruisies, very similar in form to the various Roman specimens of bronze and terra-cotta, were no doubt introduced by the Romans into England and Scotland, and later brought over by Scottish fishermen to the north coast of Ireland; they are still in use on Rathlin Island. One fine specimen shown here by Mr. Gallway, was seen in use by him in Islandmagee. Mr. R. Bell has procured specimens of cruisies

as far inland as Randalstown, but they are principally to be found around the coast where fish-oil could be procured. Whale or seal oil was used when it could be got, but crude cod-liver oil was in common use around our coast, with the pith of the rush as a wick. Mr. R. Welch shows here a neat little specimen of a cruisie from the lower Alps, presented to him by our late President, Mr. L. M. Ewart; it has only a single dish with little spout inserted to raise the wick. All the Ulster specimens have a second dish (underneath dish containing the oil and wick) to catch the drip. Cruisies were made locally at Carnmoney. Mr. M'Kinney knew of an old man called Robert Gilbert, of Carnmoney, who made cruisies of sheet iron; he had a mould cut into a block of basalt, and an iron die with which he hammered the sheet iron into mould while in a hot state. He charged 1s. each for the cruisies. Two of his specimens are here shown. In a very exhaustive paper on light and fire making, by Mr. Henry C. Mercer (delivered in Pennsylvania), he describes an oyster shell used as a lamp by negroes. Similar lamps have been used around our coast, and Mr. Alexander Wilson brought a scallop shell from Arranmore Island, which he saw in use. I shall now describe some of the specimens, as I have here about forty of the long type, not two of which are alike. Many of the most ornamental specimens are from Lisburn and Armagh districts, while some most ingenious specimens are from County Antrim. I shall be pleased if I have raised sufficient interest in this subject as may lead to the preservation of other specimens which must still be in the country.

Mr. Wilson moved, and Mr. Swanston seconded, that the paper be published *in extenso* in the Proceedings of the Club.

The next paper was on

"THE FORAMINIFERA OF THE BOULDER CLAY OF KNOCK GLEN, CO. DOWN." BY JOSEPH WRIGHT, F.G.S.

Knock Glen is situated about one mile west of the Knock Station. Here is a deep bed of Boulder Clay which is com-

paratively free from stones, and which has been cut through by the stream that runs through the glen. This clay was first examined by Mr. S. A. Stewart some 25 years ago, and four species of molluscan shells were obtained, two of them, *Leda pygmœa* and *Leda minuta*, being usually quite perfect.* A sample of the clay which he gave me contained Foraminifera in abundance, twenty-nine species being found.†

Recently, on two occasions, I visited this locality, and brought away about fourteen pounds weight of the clay. The floatings taken from the clay, and which weighed only a few grains, were all that was examined. Foraminifera were in the greatest profusion, and the specimens were in fine preservation. Amongst the less common forms the following may be mentioned:—*Ophthalmidium carinatum*, *Verneuilina spinulosa*, *V. pygmœa*, *Bolivina serrata*, *B. obsoleta*, *Lagena depressa*, *L. clathrata*, *L. ornata*, *Marginulina costata*, *Pullenia quinqueloba*, *Discorbina minutissima*, *Pulvinulina Karsteni*, *P. nitidula*, *Nonionina pauperata* and *Polystomella macella*.

The following six forms are only known as recent British species from the West coast of Ireland, the two last being also found off the West coast of Scotland:—*Polystomella subnodosa*, *Cassidulina Bradyi*, *Lagena fimbriata*, *Rhabdogonium tricarinatum*, *Nonionina orbicularis*, and *Planispirina contraria*. The occurrence of these species would lead us to infer that when the clay at the Knock Glen was being deposited, the land stood at a much lower level than now, and when the marine conditions were very similar to what now prevails off the West coast of Ireland.

The following is a list of the species obtained from this clay:—

FORAMINIFERA.

Biloculina ringens (Lamk.)—Very rare, specimens large.
Miliolina seminulum (Linné).—Common, specimens large.

* Stewart—"Mollusca of the Boulder Clay of the North-East of Ireland." *Proc. Belfast Nat. Field Club.* App. Vol. I., p. 168, 1879-80.

† Wright—"Post-Tertiary Foraminifera of the North-East of Ireland." *Proc. Belfast Nat. Field Club.* App. Vol. I., p. 161, 1879-80.

M. subrotunda (Montag).—Common.
Ophthalmidium carinatum, B. & W.—One specimen.
Planispirina contraria (d'Orb.).—One specimen.
Cornuspira involvens, Rss.—One specimen.
Textularia globulosa, Ehr.—Rare.
Verneuilina spinulosa, Rss.—Rare, specimens very small.
V. pygmœa (Egger).—Rare.
Bulimina pupoides, d'Orb.—Rare.
B. elegantissima, d'Orb.—Rare.
B. marginata, d'Orb.—Rare.
B. fusiformis, Will.—Frequent.
Virgulina Schreibersiana, Cz.?—Very rare.
Bolivina punctata, d'Orb.—Frequent.
B. dilatata, Rss.—Rare.
B. textilarioides, Rss.—Very rare.
B. plicata, d'Orb.—Very common.
B. obsoleta (Eley).—One specimen.
B. serrata (Chapman).—Rare.
Cassidulina lævigata, d'Orb.—Rare.
C. crassa, d'Orb.—Very common.
C. Bradyi, Norman.—One specimen.
Lagena globosa (Montag.).—Very rare.
L. apiculata, Rss.—One specimen.
L. depressa, Chaster.—One specimen.
L. lævis (Montag.).—Rare.
L. gracillima (Seg.).—One specimen.
L. lineata (Will.).—Rare.
L. striata (d'Orb.).—One specimen.
L. sulcata (W. & J.).—Very rare.
L. costata (Will.).—Very rare.
L. Williamsoni (Alcock).—Rare.
L. gracilis, Will.—One specimen.
L. semistriata, Will.—Very rare.
L. squamosa (Montag.).—Very rare.
L. lœvigata (Rss.).—Rare.
L. lucida (Will.).—Very rare.
L. quadrata (Will.).—One specimen.

L. marginata (W. & B.).—Frequent.
L. ornata (Will.).—One specimen.
L. Orbignyana (Seg.).—Very rare.
L. clathrata, Br.—One specimen.
L. fimbriata, Br.—One specimen.
Nodosaria pyrula, d'Orb.—One segment.
N. communis, d'Orb.—One specimen.
N. raphanus (Linné).—One specimen.
Rhabdogonium tricarinatum, d'Orb.—One specimen.
Marginulina costata (Batsch).—One small specimen.
Cristellaria rotulata (Lamk.).—One specimen.
C. crepidula (F. & M.).—One specimen.
Polymorphina lactea var. *amygdaloides*, Rss.—One specimen.
P. gibba, d'Orb.—Very rare.
P. lanceolata, Rss.—Rare.
P. compressa, d'Orb.—Very rare.
P. rotundata (Born.) ?—One specimen.
Uvigerina angulosa, Will.—Frequent.
Globigerina bulloides, d'Orb.—Very common.
G. cretacea, d'Orb.—Common.
Orbulina universa, d'Orb.—Common.
Pullenia quinqueloba, Rss.—One very small specimen.
Spirillina vivipara, Ehr.—Very rare.
Patellina corrugata, Will.—Rare.
Discorbina globularis (d'Orb.).—Rare.
D. obtusa (d'Orb.).—Common.
D. rosacea (d'Orb.).—Rare.
D. minutissima, Chaster.—Very rare.
Truncatulina lobatula (W. & J.).—Rare.
Pulvinulina auricula (F. & M.).—Very rare.
P. Karsteni, Rss.—Rare.
P. nitidula, Chaster.—One specimen.
Rotalia Beccarii (Linné).—Rare.
Nonionina depressula (W. & J.)—Very common.
N. orbicularis, Br.—Very rare.
N. stelligera, d'Orb.—Rare.
N. pauperata, B. & W.—Rare.
N. turgida, Will.—One specimen.

Polystomella striato-punctata (F. & M.).—Very common.
P. subnodosa (Münster).—One specimen.
P. macella (F. & M.).—Rare.

The paper was illustrated with a number of diagrams, and specimens of Foraminifera were shown under the microscope.

The election of several new members brought the meeting to a close.

ANNUAL MEETING.

The thirty-ninth Annual Meeting of the Club was held in the Museum on 22nd April, the President (Mr. F. J. Bigger, M.R.I.A.) in the chair.

The Annual Report was read by the senior Secretary, the Report of the Botanical Section by Mr. Alex. Milligan, the Report on Collections submitted in competition for Prizes by Mr. S. A. Stewart, the Report of the Lough Neagh Fauna Committee by Mr. R. Welch, and the Statement of Accounts by the Treasurer, Mr. W. H. Phillips.

On the motion of the President, seconded by Mr. John Hamilton, the Reports and Statement of Accounts were adopted.

In proceeding to the election of officers, the President called on the Secretary to read Rule V., and on the motion of Mr. W. J. Fennell, seconded by Mr. John M. Dickson, that portion of the Rule relating to the election of the President was suspended for one year only and Mr. Bigger requested to continue in office for 1902-03. This having been unanimously passed, Mr. Bigger was declared elected. Mr. W. J. Fennell, M.R.I.A.I., was elected Vice-President, on the motion of Mr. J. Vinycomb, M.R.I.A., seconded by Mr. R. Welch. The Treasurer, Mr. W. H. Phillips, was re-elected on the motion of Mr. Bigger, seconded by Mr. J. St. J. Phillips, and the Librarian, Mr. George Donaldson, on the motion of Mr. W. J. Fennell, seconded by Mr. H. L. Orr. The following ten members were elected as the Committee, on the motion of

Mr. Coulson, seconded by Mr. N. H. Foster:—Messrs. Wm. Gray, M.R.I.A., W. A. Green, John Hamilton, Alex. Milligan, H. L. Orr, George E. Reilly, S. A. Stewart, F.B.S.Ed., John Vinycomb, M.R.I.A., R. Welch, and Joseph Wirght, F.G.S. Messrs. J. St. J. Phillips, A.R.I.B.A., and Robert Patterson, M.R.I.A., were elected Honorary Secretaries, on the motion of Mr. N. H. Foster, seconded by Mr. Greer.

A number of places suitable for Summer Excursions having been suggested, the list was referred to the new Committee for selection.

The Secretary announced that Prizes for the best collection of building stones were offered by the Library and Technical Instruction Committee, and the matter was referred to the new Committee to draft conditions.

The election of eight new members brought the meeting to a close.



ANNUAL REPORT AND PROCEEDINGS

OF THE

BELFAST NATURALISTS'

FIELD CLUB

For the Year ending 31st March, 1903.

(FORTIETH YEAR.)

BRITISH MUSEUM
NATURAL HISTORY



SERIES II. PART II.

VOLUME V. 1902-03.

BELFAST NATURALISTS' FIELD CLUB

FORTIETH YEAR, 1902-03.

LIST OF OFFICERS.

President:

FRANCIS JOSEPH BIGGER, M.R.I.A.

Vice-President:

W. J. FENNELL, M.R.I.A.I.

Treasurer:

W. H. PHILLIPS,
LEMONFIELD, HOLYWOOD,
CO. DOWN.

Librarian:

GEORGE DONALDSON,
8, MILERIVER STREET.

Committee:

WM. GRAY, M.R.I.A.
W. A. GREEN.
JOHN HAMILTON.
ALEX. MILLIGAN.
H. LAMONT ORR.
GEORGE E. REILLY.
S. A. STEWART, F.B.S.E.
JOHN VINYCOMB, M.R.I.A.
ROBERT WELCH.
JOSEPH WRIGHT, F.G.S.

Hon. Secretaries:

J. ST. J. PHILLIPS, A.R.I.B.A., 61 ROYAL AVENUE, BELFAST.
ROBERT PATTERSON, M.R.I.A., F.Z.S., MALONE PARK, BELFAST.

Annual Report.

Your Committee beg to submit their Fortieth Annual Report. In this Report we have to record, in the first place the ordinary work of the Club, and secondly, the special labours of our Club in contributing to the reception of the British Association during the Belfast meeting, held in September, 1902.

The Summer Excursions of the Club were held as follows:—

Glenarm	24th May.
Stormont Glen	7th June.
Newry	28th June.
Enniskillen and Lough Erne	10th—14th July.
Giant's Ring	26th July.
Monkstown and Ballyclare	16th August.
Gobbins Cliff Path	27th September.

The average attendance of members at the Field Meetings was well sustained; but it would be desirable that a larger proportion should come equipped and prepared for the practical study of Natural History or Archæology, and so assist the organisation in fulfilling the primary object of the Club's constitution.

The Winter Session was inaugurated by a highly successful Conversazione on 12th November, in the Exhibition Hall, Botanic Gardens Park. Professor Symington notified that the Museum of Queen's College was open to members of the Belfast Naturalists' Field Club for purposes of study.

The Winter Meetings were as follows:—

1902.

1st Dec. Presidential Address, "Elizabethan Ireland." Mr. F. J. Bigger, M.R.I.A.

16th Dec. "Birds and their Breeding Habits." Mr. R. J. Ussher, M.B.O.U. (Lecturer, I.F.C.U.)

1903.

20th Jan. "Recent Progress in Irish Botany." Mr. R. Ll. Praeger, M.R.I.A.

17th Feb. "Rambles among and about the Mourne Mountains." Mr. Nevin H. Foster.

17th Mar. "Foraminiferal Boulder Clay from Woodburn, Carrickfergus." Mr. Joseph Wright, F.G.S.

"The West Coast of Norway and Spitzbergen." Mr. James Stelfox, M.I.C.E.

Lantern Slides of various subjects by Messrs. W. A. Green, Hamilton M'Cleery, George M'Lean, and Robert Welch.

28th Apr. Annual Meeting.

The Science Gossip Half-hours were well attended.

The Vice-President, Mr. W. J. Fennell, invited the members to a Reception on 31st October, 1902, when Sir Harry Johnston, K.C.B., G.C.M.G., gave a most interesting account of his travels in Uganda.

Delegates from your Club attended a meeting in Dublin of the Irish Field Club Union on 4th November, 1902.

The Club has to record the honour conferred on one of its members, Mr. John Brown, who has been elected a Fellow of the Royal Society.

Only one collection has been received in competition for prizes offered by the Club, viz.:—Mr. W. A. Green has submitted a set of 12 photographs of Archæological subjects under Class 23.

Your Committee were invited in December to co-operate with the Queen's College and the Natural History and Philosophical Society in forming a Society for the special study of Marine Biology. Their joint labours have resulted in the formation of the "Ulster Fisheries and Biology Association," on the Council of which your Club is represented.

We have again to thank the kind friends from whom we received hospitality on the occasions of our Summer Excursions, as detailed in Proceedings.

A short synopsis of the work done by the Club in connection with the British Association Belfast Meeting, 1902, is subjoined.

The movement to invite the British Association to meet in Belfast was formally initiated at a Committee meeting of the Club, held in the Museum on 10th December, 1897. All the officials and many members of the Club were elected on

the Local or Citizens' Committee; some occupied responsible positions on various sub-committees, notably on the Publications or Handbook Committee and on the Excursions Committee. (The preparation of a Handbook was originated by this Club in 1874.)

Your Club had representatives on the General Committee of the British Association and on many of the Sections' Committees.

Your two Secretaries (Messrs. J. St. J. Phillips and Robert Patterson) were elected by the Council of the British Association as Secretaries of Section C (Geology) and Section D (Zoology) respectively. Your ex-President (Rev. C. H. Waddell) was Secretary of Section K (Botany).

It is to be regretted that the Club, for the first time for many years, was not represented by a delegate to the Corresponding Societies, your nominee having failed to qualify.

Your Club received the thanks of the Local Executive Committee for the organisation of the official excursions as arranged by Mr. Wm. Gray, and for the assistance rendered by some of your members in conducting the excursions.

The Executive Committee also acknowledged and thanked the Club and its friends for their assistance in preparing the Handbook to the District.

During the Association week the Club (represented by Messrs. Wm. Gray and Robt. Patterson) organised and conducted the following afternoon excursions:—Giant's Ring, Roughfort, Dundonald, and Cave Hill.

At the close of the British Association week, one-day Excursions were conducted to Downpatrick and the Gobbins Cliff Path, and a four-day Excursion to the Antrim Coast and Giant's Causeway. These excursions were largely attended, and on the final day Prof. Poulton, F.R.S., proposed a cordial vote of thanks to the B.N.F.C. conductors (Messrs. W. J. Fennell, J. J. Phillips, Wm. Gray, J. St. J. Phillips and Robt. Patterson).

In connection with Section C, Mr. J. St. J. Phillips organised and carried through four afternoon and one whole-day

excursions. Rev. C. H. Waddell conducted Section K on an excursion to Colin Glen.

During the week the Publications and Appendices of the Club were exposed for sale on the bookstall in Queen's College.

(Signed)

Jas. St. J. Phillips, } *Hon. Secs.*
Robert Patterson, }

Report of Sub-Committee appointed to deal with Prize Collections:—

We have examined the set of 12 photographs submitted by Mr. W. A. Green in competition for Prize 23. These photographs are mounted in frames. It is a condition of competition that photographs become the property of the Club.

We recommend that Prize 23—amount 10s.—be awarded to Mr. Green on his supplying prints for mounting in the Club's Albums.

(Signed)

S. A. Stewart.
J. St. J. Phillips.
Robert Patterson.

Report of the Committee of the Botanical Section:—

The Committee of the Botanical Section beg to report that since presenting their last annual statement the work of this Section has been progressing satisfactorily.

During the summer of 1902 the usual outdoor excursions took place. These have for their object the verification of interesting records and also to keep members of the Section well informed as to the Botany of the neighbourhood. In both these respects the ends in view have been carried out with a gratifying amount of success.

For some years past it has been our practice to select some definite group of plants for special study during the Winter Session. Following up this practice, we selected the Ferns of the North-East district as the main objective of the winter's work. A series of monthly meetings was conducted

by the members in turn, at which the structure, growth, and propagation of Ferns in general were first dealt with, and afterwards the plants of this group recorded in the "Flora of North-East Ireland" were carefully treated of. These meetings were fairly well attended, and as the mode of conducting enabled each member to contribute to the general fund of information, we are assured that the results have been of very great benefit to members, and will be largely availed of during the ensuing Summer Session.

(Signed) Alex. Milligan, *Hon. Secretary.*

Report of Librarian:—

We have received during the past year almost all the Reports and Proceedings from the Corresponding Societies as usual, and also the usual large number of volumes, of great interest, from the American Scientific Institutes, to all of which I have sent our last Report and Proceedings, and from many of them have received thanks for the same.

I have also had applications from some of them for back numbers, so as to complete their sets of our Proceedings—the British Museum Natural History Library, The Directors of the Geological Survey of the United States of America, Barrow-in-Furness Naturalists' Field Club, and others. To all such applications I have complied by sending the numbers wanted, so far as I possibly could, but as numbers 1, 2, 4, and 5 are all out of print I could not send them to the British Museum Library, as I should like to have done, so if any of the Members have spare copies of any of these numbers, I wish they would let me know, that we might be able to have a complete set of our Proceedings in the Natural History Library of that Institution.

I got 50 copies each of our 15 Appendices stitched and covered for the late meeting of the British Association for the Advancement of Science, and we were thus enabled to sell a quantity of them to the visitors during the meeting.

We have also a quantity of numbers which would be the better for being bound into volumes—"Ulster Journal of Archæology," etc.—if we had any spare funds for that purpose, as when bound they would be more available to Members than they are at present.

(Signed) Geo. Donaldson.

Dr. STATEMENT OF INCOME AND EXPENDITURE for the Year ending 31st March, 1903. Cr.

To Balance from last year ...	...	£27	17	3	
,, Subscriptions	...	68	15	0	
,, Entrance Fees	...	5	15	0	
,, Sales of Publications ...	...	4	5	2	
,, Balance of Excursion Accounts	...	15	2	1	
		£121	14	6	

By Printing Reports	...	£25	17	6
,, Printing, Advertising, and Stationery	...	12	15	10
,, Loss on Conversazione ...	...	0	6	8
,, Rent of Museum	...	11	6	9
,, Botanical Section	...	1	0	0
,, Commission to Collector ...	...	3	2	0
,, Donation to "Irish Naturalist"	...	2	0	0
,, Irish Field Club Union ...	...	2	2	0
,, Expenses of Lectures ...	...	2	12	6
,, Postages	...	22	5	8
,, Gas Accounts	...	1	11	9
,, Prizes	...	1	0	0
,, Insurance	...	0	10	0
,, "Ulster Journal of Archæology"	...	0	10	0
Balance on hands	...	34	14	7
		£121	14	6

W. H. PHILLIPS, *Hon. Treasurer.*

Proceedings.

SUMMER SESSION.

GLENARM.

A party of twelve started by the 9-45 train on 24th May, for Larne, where they mounted cars and proceeded along the Coast Road as far as Ballygalley. The inland road was then followed, and frequent stops made to visit places of interest. Photographs and rubbings of some fine armorial grave-stones were made. Rejoining the Coast Road again, the effects of landslips were noted on the roadside and numerous Lias fossils collected.

Afternoon tea was partaken of at the Seaview Hotel, Glenarm, after which the members rambled through the village, inspecting the Church and the chalk quarries.

A pleasant drive back to Larne completed the programme.

STORMONT GLEN.

(Half-Day Excursion.)

A party of over forty members and friends went to Belmont by tram on 7th June, and, under the able guidance of Miss Walkington, LL.D., who acted as conductor for the day, entered Stormont demesne, by the kind permission of Mr. Charles E. Allan. After admiring the well-wooded avenues and rows of old yew trees, the ascent of the West Glen was commenced. The botanists of the party here began their field work; wild flowers and ferns being in profusion, while many minute mosses were also noted. The glen is exceedingly beautiful, its little stream, crossed by numerous rustic bridges, adding to the variety of the scene. When near the top a halt was called, and the Secretary announced that half an hour would be allowed for collections to be made, whereupon the naturalists scattered up and down the glen, each bent

upon his or her own particular hobby. The zoologists explored the river for various forms of animal life, dredging in the water, turning over stones, or "sweeping" the vegetation on its banks with nets and scoops. As a result of their labours many interesting finds were made and brought away for future study. At the appointed time the journey up the glen was continued, and after some very rough walking the party emerged into a lane, which brought them to the old fort or rath. Here tea was ready, and after the fatigues of the day was found very refreshing. After resting here the fort was examined, the view admired, and the usual business meeting held. Mr. Wm. Swanston, F.G.S., was moved to the chair, and he called upon Mr. W. H. Patterson, M.R.I.A., who gave an interesting account of the fort and the probable manner of life of its former inhabitants. With the exception of the Giant's Ring, it is the largest fort in the district. Although called a "fort," it was really a fortified town or village, the inhabitants living inside the enclosure in wattle or skin huts. Several questions having been answered, three new members were elected, and a vote of thanks to Miss Walkington, LL.D., brought the formal meeting to a close. The naturalists then made their way slowly down the hill, across the demesne, and thus homewards. Fortunately the weather, though threatening, kept fine, and the afternoon was most enjoyable.

NEWRY.

A large party assembled in time to start by the morning special for Newry on 28th June. The weather conditions were perfect, and the members on arrival at Newry proceeded to Daisy Hill Nurseries. Here they were met by the proprietor, Mr. Thomas Smith, who kindly devoted the morning to conducting the party around the place, pointing out the rarer plants, dilating on their structure and habits, and answering questions on his subject with the easy fluency of an accomplished *savant*, for Mr. Smith adds the knowledge of the scientific botanist to the practice of his business as a nursery-

man in a happy combination. The plants are arranged with the intention of gratifying the landscape gardener as well as being grouped to illustrate botanical affinities or variations in species; the place is laid out to contribute to an enjoyment of the beautiful in nature as well as to provide instruction for the serious student. Even the casual observer was struck with the colour harmonies and contrasts in the groups of pæonies interspersed between Japanese maples, the round, full bloom of the pæonies—some white, others delicately tinted—setting off the delicate beauty of the quivering maple leaves. The same thought is carried out in the grouping of the ferns, which here seem at home rather than finding a temporary resting-place awaiting export to some far corner of the globe. In places we find a rose tree of the sweet-smelling sort that was once the favourite in old-fashioned gardens; in another place we find the most recent of specialities, all in a state of perfection.

The cultivation of the common rose goes on side by side with the latest of hybrids, the Penzance briar; next we find a *Cistus*, and close at hand many different species; *Rosdmarina folia* was specially admired, with its showy blooms. *Osmundæ* came in for a good share of our attention. The O. *regalis* was known to all as producing *sporangia* on the upper divisions of the frond, the lower portion being leafy and barren. Close by this group Mr. Smith pointed out a variety of *Osmunda* that bore *sori* on the lower portion of the frond, with pinules on the upper portion of the same frond, while a third variety sends up shoots that produce *sporangia* alone. This gave rise to a discussion as to the functions played by parts of the plant; and rapidly we passed from one flower to another, hearing the characteristics and peculiarities of each described in rapid succession by Mr. Smith.

It would be impossible to do justice to the lower garden by sampling out a few; everyone would be attracted by different plants, but the following were the subjects of special attention:—*Eurybia illicifolia*, *Chrysolactron Hookeri*, *Mertensia elongata*, *Polygonum sphærostachyon*, *Kalmia grandi-*

floris, and varieties of *Gunnera erymurus*. In the upper garden we found a unique collection of ferns interspersed among shrubs with pleasing effects. Special notice was taken of the following: *Lastrea filix-mas*, *grandiceps* and *polydactylum; Athyrium filix-fœmina* vars. *Craigii* and *laxo-cristatum; Polystichum angulare*, *grandiceps* and *cruciatum*, *divisilobum* and *acutilobum;* and a variegated *Pteris aquilina*, in beautiful condition. At the upper portion of the garden Mr. Smith had, with great forethought, provided some refreshment for the members.

A short meeting was held, under the presidency of Mr. W. H. Phillips. After the Secretary had made some announcements as to the second part of the excursion, Mr. Adam Speers, in a few well-chosen words, proposed a vote of thanks to Mr. Smith for his kindness in conducting the party and ministering to the wants of the body as well as the mind. The proposal was seconded by Mr. George Reilly, and supported by Mr. William Gray. The members then assembled on an elevated plateau to obtain views of the surrounding country, and certainly one cannot get more charming views than are to be had from the high grounds of the nursery. Mr. Philip Crossle afterwards conducted the party to the Crown Mound, where a short description was given of the characteristics of rath, lis, and dun, and the peculiarities of the Crown Fort were dealt with. After tea in the Victoria Hotel, Mr. Crossle again took charge of the party, conducting them to the historical parts of Old Newry, and describing the various places of interest. The members afterwards returned to Belfast, fully satisfied with all they had seen and heard.

ENNISKILLEN.

(In conjunction with the Dublin Field Club.)

The Club held its long excursion during the Twelfth July holidays, 10th till 14th insts. The place selected was the district round Enniskillen. Though the excursion lasted for four days, the time proved all too short to exhaust the interest of

the place, and at its conclusion the members came away with the feeling that they had only begun to know the wealth of beauty and interest that the district contains.

On the morning of the 11th the Belfast members assembled at the Great Northern Terminus in time to take the 9-40 train. At Clones the Dublin Field Club joined us, and the combined party proceeded to Newtownbutler. Alighting here, cars were taken for Crom Castle. The Earl of Erne extended the greatest courtesy to the party in granting permission to visit the grounds and in arranging with his chaplain, Rev. J. H. Steele, to conduct the party. Mr. Steele proved a most capable guide, lucidly expounding the history and architecture of the Castle. The ancient Castle, which was one of the plantation Castles of Ulster, was commenced in 1611 by Michael Balfour, Laird of Mountwhany, in Fifeshire, patentee of the Manor of Crom. In 1616 he granted the premises to Stephen Butler, who does not appear to have ever resided here. In 1624 the place was leased to Dr. James Spottiswood, who was consecrated Bishop of Clogher in 1621. This Bishop's third daughter, Mary, married Colonel Abraham Crichton, an ancestor of the present Lord Erne. The Castle successfully withstood a siege in 1689 by the followers of King James. It is now a picturesque ruin, having been destroyed by fire in 1764. The party spent some time botanising in the neighbourhood. Orchids were found in great variety—*Orchis pyramidalis* and *O. bifolia*, *Habenaria viridis*, *Listera ovata*. The great yew tree at Crom came in for attention from the photographers. This great yew resembles an enormous mushroom in outline, and has evidently been a trained tree, its horizontal branches being supported on pergola-like supports of timber, upheld by 60 stout props. Though its total height is only 25 feet, the umbrage or circumference of outspread branches is 250 feet, and spread of branches from north to south 78 ft. The girth of stem is 12 ft., and height from ground to branches 6 ft. There is no authentic record of its age, but tradition has it that an O'Neill, attainted in Queen Elizabeth's reign, took leave of his ladylove under the "old

yew at Crom." The *pleached* yew-tree bower stands close to the other, and is probably as old. This yew has been trained into an arbour or bower " with seats beneath the shade," now represented by a few stones. The branches have been so intertwined (they are now intergrafted in many places) as to remind one of the old Celtic interlaced work of other days, and the result is one of the most remarkable examples of the "pleached bower " to be seen in Ireland. The water valerian was common, with great masses of meadowsweet and purple loose-strife.

Proceeding to Crom Pier, the party embarked on the s.s. Belturbet, kindly placed at their disposal by Miss Porter, of Bellisle, a member of the Dublin Club. An hour's steaming down the lake provided an ever-varying panorama of island and water, till we reached Knockninny Pier. Here we landed to allow time for collecting. Some of the more energetic climbed Knockninny Hill in the expectation of finding newly-unearthed antiquities in the cairn on the summit. On the ascent, the butterfly orchid was found in great plenty. On the summit Mr. Thomas Plunkett, M.R.I.A., of Enniskillen, was waiting us, having been engaged all morning directing operations of excavating the cairn in the expectation of having an exhibit of antiquities *in situ* for the benefit of the Club. Though all our expectations were not realised in this respect, we yet found much to discuss, and expect that more extended excavations will add another record to the many finds made by Mr. Plunkett in the district. From the top of the hill we got an extensive view of the Upper Lough Erne and the district that was to be the scene of excursions on the following days.

Knockninny, according to tradition, derives its name from St. Ninny's connection with the place. He was of the race of Niall of the Nine Hostages, a pupil of St. Finnian of Clonard, and Bishop of Inis-Muighe-Samh (the island of the plain of the sorrel), in Lower Lough Erne. From the number of cairns on the summit of the hill, as well as from the traditions connected with the name, the place must have been a centre of some importance in the olden times.

Tea awaited the party at Knockninny Hotel, charmingly situated near the shores of the Lough. Entertainment of another kind was also provided, for we found that a water polo match had been arranged to take place at Knockninny Pier just before the steamer cast off.

A two hours' run through charming scenery, past old castles and monasteries, allowed us to admire such finely-wooded demesnes as Bellisle, or to talk ancient history and literature, for it was at Bellisle that Cathal Maguire compiled in the fourteenth century one of our most valued historical records, "The Annals of Ulster." Lisgoole, the home of the "Children of the Abbey," was next passed. Lisgoole was formerly a monastery of some note. It is mentioned by the Four Masters as Lisgabhail (the fort of the fork). At present a picturesque, semi-castellated residence occupies the site of the old Abbey.

Arriving at Enniskillen, the party proceeded to their headquarters, the Royal Hotel. Owing to the numbers on the excursion a section had to be accommodated at the Imperial Hotel.

Owing to the inclement weather on the morning of the second day, it was decided to postpone the hour of starting announced in the programme. The interval, however, allowed the members to visit the public park, and those who braved the elements were well rewarded. The park is certainly one of the show places of Enniskillen district, and reflects the greatest credit on the landscape gardener who had charge of the laying out of the grounds and selecting the various plants which are here found in luxuriance. Wild flowers as well as garden flowers and shrubs are well represented. The fernery seems to be modelled after nature, the blocks of limestone carefully selected and put together, so that the place looks entirely natural. Growing among the rocks we found many varieties of ferns, common *Polypodium* side by side with *Pteris aquilina*, *Lastrea* and *Athyrium*. In the shelter of the old bastions we found varieties of *Gunnera* in

excellent condition. In other places Japanese maples and syringa gave colour and brightness to the scene.

Some members ascended the monument and enjoyed an extensive view of the Upper and Lower Loughs, as well as overlooking the old town of Enniskillen, the ancient Inis-Cethlen, or Cethlen's Island. The town therefore can boast of its ancient foundation, for Cethlen was the wife of Balor of the Great Blows, the Fomorian King of Tory Island. Cethlen could give a good account of herself in battle, for it was she who inflicted a fatal wound on Dagda, the King of the Dedannans, in the second battle of Moytura.

Speed's map of Ireland gives a picture of Enniskillen Castle about 1600, and to-day some old walls and turrets rise to remind us of the troublous times in 1594, when Fitzwilliam took Maguire Castle, and when Maguire and O'Donnell laid siege to recover it. In those days the castle was a prominent feature of the city and the centre of power; to-day the tower of the Town Hall rises to call attention to the more peaceful conditions of life of the citizens and the more stable government of the land.

A short interval of fair weather favoured our start at ten o'clock on the s.s. Wigeon for the Lower Lough. The scenery on each side of the river was much admired. Portora School, standing on the summit of a hill wooded down to the water's edge, or the stretches of green lawns, made exquisite pictures. Further down the Castle of Portora was seen, but it presents no feature of special interest in its present condition.

The Round Tower of Devenish soon came into view, and a stop was made to allow us to land on the Island. The time was too short to allow of a thorough examination of the ancient churches and other remains, but we saw so much that we were satisfied that the details could not be studied in one short visit. The principal objects were seen and photographed —the ancient Celtic Church, the Round Tower, St. Mary's Abbey, and the High Cross. Returning on board our boat, we were soon in sight of Inismacsaint, another sacred island with ancient remains. Mr. Edward Archdale met the party on

the pier at Castle Archdall. A walk through a wooded lane and a short ascent by garden paths brought us to the terrace of the house, where we were hospitably entertained to lunch by Mr. Archdale, and afterwards boats were placed at our disposal to visit White Island and Davies Island or for dredging. One section, however, preferred to roam about the well-kept grounds and gardens. The botanist found much to note, among which the following may be mentioned:—*Habenaria bifolia*, *Epipactis latifolia*, *Listera ovata*, *Neottia nidus avis*, *Caltha radicans*, *Sparganium ramosum*, *Scutellaria galericulata*, and white variety; *Lychis flos-cuculi*, white variety. Among the *Lepidoptera* the following were noted:—*Plusia bractea* and *Acentropus niveus*. The shell *Succinea oblonga* was found on Davies Island. The eighth century church on Davies Island was visited, and the Sheela-na-gig carvings photographed. The return sail to Enniskillen was made under a heavy downpour of rain.

The programme provided no official excursions for the third day. A few members went out to Monea, where dwellings representative of three periods of history were found in proximity. The mansion of Monea, situated on an eminence and enclosed by a well-wooded park, represents the modern period. The castle of Monea, represents the life of mediæval times. It was a place built for security in times when neighbouring princes made sudden raids on the castle and property of their weaker or ill-prepared neighbour. The old lines enclosing the bawn are well defined around the castle proper. Two corbelled gables, overhanging flankers and other devices of the military engineer give the place an appearance of strength and power that is absent from the modern residence. Close to the castle is the crannoge, representing the life of prehistoric times. A clump of trees surrounded by rushes in the centre of a quiet lake is all that is now visible of this early dwelling. The inhabitants relied on their first line of defence—the marsh and lake—building their wooden huts on the island. It was an admirable place of defence for the times, but one from which it would be difficult to make a sortie. Proceed-

ing through country lanes, we reached the Chapel of Monea, a delightful specimen of a mountain church, harmonising with its peaceful surroundings. To many its chief interest may be the old window removed from Devenish, but he would be a confirmed antiquary who could not see beauty also in the partly modern church of Monea.

Taking lanes and byroads, we walked along by the foot of the Knockmore escarpment till a stiff climb up a mountain road gave us another panoramic view of great beauty. The shaft of a sculptured stone cross in the Boho Churchyard was inspected. The road now became very hilly, and proved rough walking, but the scenery was well worth the labour. The tall fir trees in front of Carn House and the roadside trees and flowers provided pictures for photographers, while a lively description by Mr. Plunkett of old battles fought on the hillsides adjacent almost called into life and being the Maguires and O'Flannigans, the ancient inhabitants of the land. At Boho Police Barracks we took a field path leading past an old fort to a most romantic glen. The cave in the limestone tempted many to explore its mysteries, to hunt for bats, or to wander far into the dark underground passages. Mr. Plunkett had thoughtfully provided afternoon tea on the lawn near the police barracks. Afterwards a second cave was explored and illuminated brilliantly, and the party returned in the evening to Enniskillen. After dinner Miss M'Kenna delighted the company with a brilliant performance on the harp.

The fourth day found the members astir at an early hour, and at 8-30 the whistle signalled the start of the cars. Our destination was the Marble Arch. The road from Enniskillen combines scenery of varied types. At first the soft, rolling hills, clothed in places with broad pasture lands, backed by woods; next a wide expanse of bog, with turf-cutters busy laying in their stock of fuel for the winter. Then we have the mountain scenery—tall cliffs, with well-wooded talus slopes. Through the trees growing by the roadside we get vistas of precipitous walls of rock deeply scarred by the hand of time,

and in places the black mouth of some long cavern is seen. A walk of about a mile up a beautiful glen brings us to the celebrated Marble Arch. Rapidly crossing the arch, the party got on to the open mountain, and, under the leadership of that prince of guides, Mr. Plunkett, soon found themselves above a deep glen. At the bottom of this was found a small opening, through which the party made a descent over rugged rocks. A short journey by narrow byways led us to a rapid underground river. Torches and flares were lit, and we found ourselves in a cavern of considerable dimensions, in places at least thirty feet high. The smoke of the flares made us postpone all philosophising in the cave, and hastened a rapid retreat, which was executed with safety over the difficult ground. On our return to the Marble Arch we saw the entrance to another cave, but, as it is not easy travelling and requires the use of boats, we remained satisfied with the description of it published by Monsieur Martel in the journal of the Alpine Club.

The drive home was accomplished in quick time, and the whole party left Enniskillen by the afternoon train, passed safely through the maze of intricate train arrangements at Clones (where the Dublin members left us), and we arrived at Belfast with the idea that we had not exhaused the excursions possible to be made from Enniskillen as a centre.

GIANT'S RING.

(Half-Day Excursion.)

The Club met on Saturday 26th July at the Malone Park gates, for a half-day excursion. Owing to the severe thunderstorm which raged in the forenoon there was a small attendance, fourteen members only mustering at the hour appointed. As the weather showed signs of improving, the members decided to start, feeling confident of the well-known good luck of the Club in matter of weather. The road for Shaw's Bridge and the Giant's Ring was taken, a brief atten-

tion being paid to the old fort of Sir Moses Hill commanding the valley of the Lagan just above the bridge.

On arrival at the Ring the wet state of the ground proved unfavourable for collecting, but the members spent some time in pleasant discussion on the features of the Ring and Cromleac, which form one of the most remarkable monuments of prehistoric times in the North of Ireland.

Mr. John Brown, F.R.S., of Longhurst, now joined the members, and escorted them by the main road to the grounds of Edenderry House. Here the picturesque old gardens were shown, and Mrs. J. S. Brown gave a cordial welcome to the visitors. Subsequently the path through the shrubberies was taken, leading to the ferry. Following a private path, the charming home of Mr. John Brown was soon reached. After tea the visitors inspected Mr. Brown's splendid collection of minerals from the Mourne Mountains. On leaving their kind hosts the members took the path by the river, and again reached the tramway terminus, when the excursion concluded.

Owing to the wet state of the ground Botanising was difficult. One plant, a rare sedge, deserves recording—*Carex teretiuscula.*

MONKSTOWN AND BALLYCLARE.

On Saturday, 16th August, the Club held its sixth field meeting for the present Summer Session, visiting Monkstown and Ballyclare. A party of twenty-six members left from the Linenhall Library, and drove by the Shore Road to the ivy-clad ruins of Whiteabbey, all that remains of the abbey founded for White Canons, and which was an offshoot from the Abbey of Dryburgh, in Scotland. Ascending the slope of Knockagh, the party visited the ruins of Monkstown Abbey, the reputed burial-place of King Fergus. There were a number of distinguished persons of this name, but the Fergus supposed to be buried at Monkstown was Fergus MacErc, who

became first King of Scotland. The Royal Society of Antiquaries of Ireland, in their report of the meeting held in Belfast in 1892, say—"Carrickfergus is so called from Carrig, a rock, and King Fergus, who, when coming here in 320 B.C. to visit the well, now within the Castle, for the cure of leprosy, was shipwrecked and buried at Monkstown adjoining." The date given here is inaccurate. Keating in his history tells us that Fergus was the first King of Scotland, and became so early in the sixth century, and the Rev. George Hill, in his invaluable work, "The Macdonalds of Antrim," gives a full account of the matter, and shows that Fergus MacErc became King of Scotland in 506 A.D. The father of Fergus was a prince of Dalriada, and his seat was at Armoy, near Ballycastle. He had three sons, Fergus, Angus, and Lorne. From the latter the Duke of Argyll's family are descended. The descendants of Angus became Lords of the Isles, from whom the Macdonalds sprang, and Fergus became the first King of Scotland. It was for the purpose of crowning him that the "Lia Fail," or stone of destiny, was taken from Tara to Scotland. This stone was subsequently taken to England, where it has been used for hundreds of years at the coronation of our monarchs, and was so used recently at the coronation of King Edward VII.

At Monkstown a formal meeting of the members was held, under the chairmanship of Mr. W. H. Phillips. Mr. Wm. Gray gave a short address on the historical associations of the place, and announced the further arrangements for the day. Proceeding a few miles further, a visit was paid to Lisnalinchy Fort, an excellent example of the early Celtic earthen fortification. The Rath around the circular Lis and the outside fosse are still in fair condition, and well worth preserving. Every feature of the fort was closely examined, the botanists being specially interested in the fosse or trench. The next halt was at an ancient monument known as Wiley's Fort, a circular earthwork of about eighty paces in diameter. The encircling rath has been levelled, but part of the fosse remains. This fort has connected with it a souter-

rain or underground dwelling, which is not now accessible, and from the number of stones scattered over the surface, it is to be feared that the structure has been damaged, if not entirely destroyed. It is to be regretted that so many of our interesting old Irish monuments are allowed to fall into dilapidation. Among our many ancient earthworks few are more worthy of preservation than Wiley's Fort.

The forts explored on this occasion occur in a district that has yielded considerable quantities of iron ore and bauxite, but time did not permit the party to visit the mines where the minerals are procured. As to the botany of the district passed over so quickly, there was not so much variety as might have been expected; nevertheless several of the less common plants were collected. The Quaking Grass, *Briza media*, was found at Monkstown and at Ballyclare. The Water Purslane, *Peplis Portula*, was growing plentifully in the ditch at Lisnalinchy Fort, with the Water Starwort and other marsh plants. The mountain form of Lady's Mantle, *Alchemilla vulgaris*, was met with at Wiley's Fort, and with it one of the less common Trefoils, *Trifolium medium*. At Ballyclare one of the rarer Yellow Rockets, *Barbarea intermedia*, was gathered by the river bank.

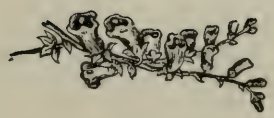
A halt was made at Baird's Hotel, Ballyclare, to prepare for the return journey. No more appropriate place could be selected, with its quaint garden of strange shrubs and flowers, fantastic summer-houses, quiet nooks, rustic seats, decorative figures, and antiquarian objects. Attendants attired in ancient Irish costume marched in silence to and fro, bringing up a succession of geological and antiquarian objects, stone, bronze, and iron weapons, illustrative of prehistoric and mediæval times, and thus furnished the members with ample materials for examination and discussion during their stay, which was found to be very much shorter than the many attractions of the place rendered desirable. From Ballyclare the party returned to Belfast by the Antrim Road, and thus completed a most enjoyable day's outing.

GOBBINS CLIFF PATH.

(Half-day Excursion.)

The final excursion of the Club took place on Saturday, 27th September, the place selected being the Gobbins Cliff Path, recently opened by the enterprise of the Northern Counties Railway. The day being an exceptionally fine, bright, autumnal one, the members of the Club and their friends turned out to the number of 126, and left by the 12-50 p.m. train for Ballycarry Station, with the Vice-President and Mr. Robert Patterson, Hon. Secretary, acting as guides. Owing to the numbers being so largely in excess of those expected and prepared for, the party had to be divided at Ballycarry, and the cars had to do double duty, starting first with sixty and then returning for the remainder, and even then each car had to carry seven passengers and the driver. The sub-division allowed the first party to start at the near end of the path, and the cars then carried the second portion to near Hill's Cottage, where both rejoined and commenced the Cliff Path proper. On this walk several of the members pointed out and explained the various points of interest, in the geological formation, with its beautiful sections of amygdaloidal basalt, studded on every conceivable portion with zeolites sparkling in the sunlight; the great dykes; the long red layers of iron and ochre punctuating, as it were, the chapters in the history of the earth's formation; the great sea caves; the long line of raised terraces, showing a gradual upward movement of the crust, and the wearing away of portions of the cliff and the consequent formation of islands, bays, heads, and recesses. The botanists of the party soon found the beautiful Sea Spleenwort (*Asplenium marinum*), and were loud in their praise of the precautionary measures taken for its safety. Amongst other things noticed were the winter homes of the common garden snail (*Helix aspersa*) hollowed out in the chalk. These came in for a large share of close attention. One member of the Club handed in the following list of birds he had noticed during the afternoon, viz.:—Song

thrush, blackbird, stonechat, redbreast, wren, pied wagtail, meadow pipit, rock pipit, swallow, greenfinch, house sparrow, linnet, corn bunting, yellow bunting, starling, jackdaw, rook, skylark, cormorant, heron, oyster-catcher, black-headed gull, common gull, and herring gull, making a total of twenty-four species. With reference to the path itself and its construction from an engineering point of view, one continuous chorus of praise was its just tribute, and many expressed desires to return and enjoy more leisurely the stately grandeur of the noble cliffs as seen from the safe structures of Mr. Wise, the engineer of the Railway Company. On the return from the path the goodly company of six score stopped at Hill's Cottage for tea. At this point a deadlock was within measurable distance, but the resourceful efforts of the Hon. Secretary surmounted all difficulties. He foraged round and got in extra provisions, and even when the milk was finished he was not to be beaten, for he "commandeered" a cow and brought it into the camp, and the subsequent operations caused much amusement. After tea cars again brought the members and guests to Ballycarry en route for Belfast, with many expressions of praise and gladness that the final excursion of the Session had been so successful.



Winter Session.

ANNUAL CONVERSAZIONE.

The Winter Session of the Club was opened on the 12th November by a most successful Conversazione, held in the Exhibition Hall, Botanic Gardens. The Committee had prepared an excellent and varied programme, and members and friends attended in large numbers to partake of the mental and other food prepared for them. The attendance exceeded 300, and there was great life and "go" in the proceedings, showing that, in its fortieth year, the Club is exhibiting no sign of senile decay. On the contrary, many members expressed the opinion that this Conversazione was one of the best of recent years. The tables were so arranged as to allow ample facilities for examining the various exhibits, and each exhibitor was fully occupied all evening in explaining the details and significance of his or her exhibit. The doors were opened at 6-30. Tea was served from 7 to 8 o'clock, and Mrs. Wright, Mrs. Marsh, Mrs. Phillips, Mrs. Fennell, Mrs. Patterson, Mrs. Vinycomb, Mrs. Hamilton, and Mrs. Green, who kindly acted as tea-makers, had a busy hour. The tea tables were decorated with flowers and plants kindly lent by Mr. Charles M'Kimm. From 8 to 9-30 was occupied by the conversazione and exhibition, and members fully availed themselves of the opportunity of seeing many objects of interest.

Microscopes were made the leading feature of the evening, the following members exhibiting:—Miss Mary K. Andrews, volcanic ash from St. Vincent, igneous rocks; Mr. John Donaldson, pond life; Dr. W. D. Donnan, sections illustrating the structure of the body; Mr. Wm. Gray, M.R.I.A., a cabinet of microscopic preparations illustrating a wide range of subjects, methods of preparation and mounting were explained; Mr. Henry Hanna, B.Sc., parasites of man; Mr. Alex. Milligan, plant spores; Mr. H. M'Cleery, insect prepa-

rations and rotifers; Mr. Robert Patterson, M.R.I.A., marine larvæ; Miss C. Patterson, live specimens; Mr. J. St. J. Phillips, B.E., rock sections; Dr. Cecil Shaw, sections of the larynx; Mr. Adam Speers, B.Sc., rock sections; Mr. Wm. Swanston, F.G.S., fossil sections; Mr. James Stelfox, C.E., miscellaneous; Mr. R. Welch, micro-mollusca; Mr. Joseph Wright, F.G.S., foraminifera of the Boulder Clay of Woodburn, Carrickfergus. Messrs. Lizars had a fine exhibit of microscopes and microscopic accessories of all descriptions, which attracted much attention. The other exhibits were as follows:—

Botany.—Mr. N. Carrothers, mounted botanical specimens; Mr. J. H. Davies, a bundle of *Hyocomium rugosum*, a rare Irish moss from Portstewart; Mr. W. A. Green, seaweeds from Ballycastle; Mr. F. Gulbransen, plants from Botanic Gardens, N.S.W.; Mr. W. H. Patterson, M.R.I.A., giant puff-ball, from Shropshire; Mr. W. H. Phillips, rare British and other ferns; Mr. R. Ll. Praeger, M.R.I.A., additions to the flora of the North-East of Ireland, made in the Ardglass district, 1902; Mr. George E. Reilly, specimens of New Zealand woods.

Zoology.—Mr. John Cottney, collection of Irish-taken eggs; Mr. Nevin H. Foster, eggs of 97 species of birds breeding in County Down; Mr. W. A. Green, American fresh-water mussels; Mr. John Hamilton, specimens of Indian "Tussora" silk-moth; Mr. Robert May, wood perforated by various animals; Mr. J. M'Bride, jun., eggs of tortoise, laid in Ireland; Mr. H. Lamont Orr, Irish butterflies, &c.; Mr. Robert Patterson, M.R.I.A., birds' nests, down taken from various ducks; Dr. R. F. Scharff, M.R.I.A., remains of a new Irish mammal, and of other animals from Keash caves, County Sligo; Professor Gregg Wilson, D.Sc., eggs and embryos of *Platypus* and *Echidna;* Mr. R. Welch, methods of mounting and storing *mollusca.*

Geology.—Mr. Robert Bell, cretaceous *pisces* from Counties Antrim and Derry; Madame Christen, igneous rocks from Saxony, stone implements from Saxony; Monsieur Christen,

cretaceous and other fossils from Saxony; Rev. P. Quail, rock specimens; Mr. W. B. Wright, B.A., Ailsa Craig rock from Ballyhill.

Miscellaneous.—Miss Andrews, old coins; Mr. C. Bulla, old Irish sword-stick from Ardboe, and bones from Donegal caves and River Blackwater; Mr. W. A. Green, Irish bog butter, mounted photographs; Mr. A. R. Hogg, animated photographs of natural history subjects; Miss L. Lamb, photographs of two round towers at Ravenna, a few photographs of Italian churches showing interlaced patterns in stone work; Mr. Robt. Patterson, M.R.I.A., autographs of members of the "Red Lion Club" present at the Belfast meeting of British Association, 1852; Mr. John C. W. Reid, old Irish cross-bow and Dublin-made pistols; Mr. George E. Reilly, African bark-cloth, made by natives; Mr. R. Welch, evolution of the Irish outside car, wedding dance-masks from West Coast of Ireland, photographs taken at the Club's summer excursions. Mr. Kilpatrick exhibited a number of photographs taken during the recent meeting of the British Association.

Punctually at 9-30 the President, Mr. F. J. Bigger, M.R.I.A., took the chair, and delivered a short address. After welcoming the Delegates from the Dublin Naturalists' Field Club, the representative of the Londonderry Literary and Scientific Society, and the newly-appointed Professor of Natural History in Queen's College (Professor Gregg Wilson, D.Sc.), Mr. Bigger went on to refer to the recent meeting of the British Association in Belfast, and stated that certain members of the Club worked whole-heartedly during the week of the visit, and contributed in no small degree to the success of the meeting. He also referred to the "Handbook" which was written for the meeting by members of the Club, and described it as a most valuable scientific guide to this district. He drew the attention of members to the new feature introduced by the Secretaries at that meeting for the first time—viz., the bookstall, where the Club's literature was on sale all evening. Here could be bought the Club's "Proceedings" and papers, the new Handbook, the "Irish Naturalist," and

the "Ulster Journal of Archæology," &c. He wished the new feature every success, and hoped it would become permanent, so that no member would have any excuse for not possessing a full set of the Club's literature. The President then called on Professor Symington, M.D., who stated that he had inserted a new instruction in the calendar of Queen's College to the effect that members of the Belfast Naturalists' Field Club would be admitted to the Natural History Museum of the Queen's College on presentation of their card. The College was most anxious to co-operate with a scientific Club such as he was addressing, and all members were welcome to make all the use they could of the College. This announcement was received with much applause. The election of twelve new members brought the formal business to a close, and the lantern display was then proceeded with, the lantern being in charge of Mr. A. R. Hogg. The first set of slides shown dealt with microscopic objects, some of which were extremely beautiful. The summer excursions were then shown, those taken at the Enniskillen excursion being very good. Other subjects dealt with were geological formations, Ballinderry Middle Church and New Zealand scenery, the exhibitors being —Messrs. William Gray, R. Welch, J. St. J. Phillips, W. J. Fennell, and George E. Reilly. Afterwards Mr. A. R. Hogg showed a splendid series of animated photographs of animal life, Polar Bears being fed at the Zoo, seals deftly catching fish thrown by the keeper, &c.

These were much admired, and Mr. Hogg's enterprise fully appreciated. It was quite a late hour before the members separated, and a most successful meeting came to an end.

PRESIDENTIAL ADDRESS.

The first business meeting of the Winter Session was held in the Museum on 1st December, when the President, Mr. F. J. Bigger, M.R.I.A., read a paper entitled "Elizabethan Ireland."

Mr. Bigger, who was cordially received, said in the age of Queen Elizabeth there was in Ireland no government as they understood that expression; men did that which was right in their own eyes, and the country got on fairly well without law courts or police. Small lords existed side by side with great ones, and passed on their estates from generation to generation, as if a strong Government protected men in their rights. Great chieftains, like O'Neill or the Lord of Desmond, no more thought of doing gross injustice to small lords than a strong man would to-day think of hurting a little child or a poor cripple. They had their wars, as persons nowadays had their quarrels and law-suits, but they made friends again. Those internecine quarrels were not always very destructive to life, but were often in the nature of duels; two chieftains had a dispute, and, if there was no Government, the matter had to be decided by war. They met and fought it out like gentlemen and men of honour, and the loser paid generally in cattle or land. Many of the chieftains delighted in great castles of stone, with walls many feet thick, and others preferred the more primitive crannoge, or fortified island, in a lake; others, again, like the Savages of the Ardes, declared that a castle of bones beat a castle of stones, and long resided in the woods, sheltering in rude huts and wigwams, like Robin Hood in England. With the advent of the House of Tudor, and the more aggressive policy of that race in regard to Ireland, one after another of the great captains of Irish territory stepped out to fight with the Crown. The houses of Kildare and Desmond, and the O'Neills and the O'Donnells, and the De Burghs of the West went out against the Crown, wrestling fiercely, strenuously, often victoriously, with the Tudors, but ultimately in vain. Shane O'Neill at one time conquered all Ulster, and seemed about to conquer Ireland. His government was so strong that many farmers fled to him, even out of the Pale, to enjoy the good peace that prevailed under him when he was in his strength. At this time there were few tolerable roads in the country; a certain number of stone causeways did exist, but most parts of the island were covered

with natural woods, and these could be crossed only by passes, which the chieftains periodically agreed to cut for the troops and for peaceful travellers. Ulster was, on the whole, rather hilly, and it was easy to see how strong it must have been when all the woods were still uncut, and there were practically no roads, and drainage had not been thought of. The most inaccessible forest was that of Glenconkein, now in the County Derry, and it was supposed to have been one of the finest forests in Europe at that period. In subsequent years it was held out as a strong inducement to the great London companies to take estates in the country, and they did not long hesitate to cut down the woods, with their great oaks, and ship them to England. No part of that forest remains at the present day. These woods, in the absence of roads, and the proximity of mountains, made the country particularly suited for guerilla warfare. Fighting in Ireland was the serious business of life, but soldiers, officials, and settlers found some time for amusement also. Irish hawks, hounds, and horses were all thought worthy to be sent as presents to great men in England, and hawks were often made the subject of treaties with the Irish chieftains. Red deer abounded all over the country, and the Earl of Ossory kept a pack of hounds to hunt the martens alone, the skins of which were much esteemed. The poorer classes attended to the cattle, and fought for them as for religion and life, and even when they were almost starved, they would not kill a cow except it was old and yielded no milk, yet would they upon hunger in time of war open the veins of a cow and drink the blood, but in no case kill, or much weaken it. The Scottish Highlanders bled their cattle in this way up till the nineteenth century. There were frequent alliances between the Irish chieftains and their daughters and the English and Scotch nobility. The bagpipe was commonly used in the field, and the harp in the hall, the latter being seldom absent from the furniture of a gentleman's house; the portion of a bride in Tipperary being sworn to as four score cows, four and twenty mares, five horses, a pair of playing tables, and a harp, besides household stuff.

When war was not raging the country was comparatively free from ordinary crime. When the Tudor dynasty succeeded to the Throne of England, the Crown had hardly any power in Ireland. The country was governed by the great lords, under whom were minor chiefs. Ireland was a nation of nations, comprising nearly one hundred distinct governments. Even the Pale, which was often considered distinctly English, was only held by the strong intervention of one of the great Norman families, usually of the house of Kildare. With the advent of Elizabeth and the more aggressive policy carried on by her statesmen and her captains, a new regime was soon brought about. From wars and rumours of wars thenceforward the island was never free. It was an age of great activity in England; the best blood of her great houses had traversed the Western main, fighting and harassing—pirating, if they liked it—the Spaniard in his strongholds along the coasts of that half-discovered Continent. The Shane O'Neill wars in the North and the Desmond wars in the South were somewhat familiar to all; the aftermath of those devastations made a horrible record. To what extent the State embroiled itself with the chieftains and the chieftains resisted the State might be realised when he mentioned the fact that there was no great lord in the land who had not at one time or another in his career been out in rebellion. The greatest and the noblest of all the Elizabethan Viceroys was Sir John Perrott, a son of King Henry VIII. He it was to whom most credit must be given for having brought into almost complete subjection all the great lords of Ireland. The President, after describing in detail the great Parliament of the Irish chieftains called by Perrott in 1585, said for many years the great dread of the Spanish Armada hung over the whole of England, the rumours being, perhaps, worse than the reality, dangerous as that was. All England rallied nobly to the standard of the Queen in resistance to the proud Spaniard, and the heroic deeds of Drake, Frobisher, Grenville, Hawkins, and Howard would be told while the world lasts. Scattered and broken by the winds of heaven and the irresistible onslaughts of

the volunteer ships of England, a fragment of the great Armada —broken, strained and leaking at every joint—beat up against the Western shores of Ireland. How were they to be received? Were their friends in the country, their co-religionists, and perhaps sympathisers, going to extend to them any assistance, or even hospitality or shelter? Charity as it is now understood, would say that that might easily have been done without any risk to the State, but times were too hard, and life was too cheap, and plunder too irresistible for the men of that period. In almost every case where a Spaniard landed, or a great galleon was dashed to pieces, the Irish swept down as ruthless as the English soldiery, butchering and plundering at every opportunity. They had one or two instances, however, of a more cheerful nature, proving that all chivalry was not dead amongst Irish chieftains. The President, in conclusion, said the period of which he had spoken was the time when old territorial arrangements, the chieftainry, and the religious houses were broken and dissolved for ever, and a new order of things initiated. They might lament the past, but they must accept the present. The burnings and the slaughters and the rivalries and the usurpations had gone, but to have a proper understanding of their present position, their prospects and their aspirations, it was essential that they should know these facts, and from them learn what might guide and instruct them in the paths that lay before them.

A most comprehensive series of slides illustrated each scene described and person alluded to, many of them being from rare contemporary prints.

At the conclusion of the lecture, on the motion of Mr. John M. Dickson, seconded by Mr. W. J. Fennell, and supported by Messrs. F. R. Lepper and William Gray, a hearty vote of thanks was accorded to the President, who suitably acknowledged the compliment, and the proceedings terminated.

"BIRDS AND THEIR BREEDING HABITS."

The second meeting of the Winter Session was held on 16th December, when Mr. R. J. Ussher, M.B.O.U., delivered

a lecture on "Birds and their Breeding Habits." There was a large attendance at this lecture, and Mr. F. J. Bigger, M.R.I.A., who presided, introduced the lecturer as a leading authority on ornithology in Ireland. He was better known to many of them by his well-known and standard work on "The Birds of Ireland," published about two years ago. They had in the Belfast Naturalists' Field Club too few students of ornithology. Mr. Robert Patterson was a great authority, but he thought he would yield first position to Mr. Ussher, who had come all the way from the South to deliver a lecture to them.

Mr. Ussher, proceeding with his lecture, said—No class of living creatures has inherited habits which afford more interesting study than birds. The peculiarities of their eggs and young are suited to the parents' mode of disposing of them, and afford a considerable clue to classification. In the eggs, their number, their shape, and their colouring are characteristic in different groups of birds. Thus, as a rule, auks and petrels lay one egg; pigeons, nightjars, and divers lay two; gulls and terns three; plovers and sandpipers almost invariably four; most of our small birds and crows lay from four to six eggs; while game birds, ducks, and rails lay from eight to twelve. As to shape, owls and falcons have rounded eggs; nightjars, pigeons, grebes, and petrels have eggs which incline to be equally rounded or equally pointed at both ends; plovers and sandpipers have pear-shaped eggs, and this enables the invariable number of four with their points turned in to fill the nest exactly. Thus eggs very large in proportion to the bird's size can be produced. The use of this arrangement was explained. Eggs of guillemots are drawn out to a long point, so that when they roll they perform a curve, and this tends to prevent them from rolling off the bare ledges of the cliffs on which they are laid. Then as to colour, various groups of birds have eggs of a special colouring. Those of thrushes and crows are blue or green, with brown spots or specks; those of tits are white, with reddish spots; those of buntings are streaked; woodpeckers and kingfishers lay glossy

white eggs; those of owls, though white, are wanting in polish; falcon's eggs are reddish-brown; those of rails are buff-coloured and speckled; ducks and geese lay unspotted eggs; those of cormorants and grebes have a white, chalky coating; eggs of gulls are olive, with brown and grey spots; and those of guillemots, which lay together in colonies without any nests, are wonderfully varied, each bird having a colour pattern of her own. That white eggs are hidden from the view of enemies in holes or in covered nests is true in most cases—*e.g.*, the barn-owl, dipper, swift, kingfisher, rock-dove, sheld-duck, and petrel. It is obvious that such conspicuous objects as white eggs would readily attract their enemies if they were not under cover. On the other hand, those eggs which are placed on the open ground are protectively coloured so as to resemble surrounding objects. Those of the nightjar, though white, marbled with brown and grey, look at a little distance like rough quartz pebbles; the eggs of the ringed plover and little tern, laid among shingle, pebbles, and shells are so like pebbles on the strand that one treads on them before they are recognised; and the same may be said of many others which, laid on the ground like those of the oyster-catcher, are quitted by the parent bird on the approach of an intruder, while she uses all her arts to draw him away in pursuit of her. She feigns to be lame or disabled, or she circuits on the wing before him, vociferating loudly, like the redshank. The state of the young when hatched differs to an extraordinary extent, as it does in *mammalia* when they are born. The young of the fox and rabbit in its burrow is at first blind and helpless, while the calf or foal can follow its mother the day it is born; so the young of our song-birds, which have comfortable and often elaborate nests, are blind, naked, and helpless when they are hatched, and can only open their mouths to receive food from their parents' beaks. How different is the condition of some of the ground-breeding birds! On quitting the egg it is covered with profuse down, protectively coloured; it can see, can run or swim, and can feed itself. A young chicken or duck will illustrate this. Its mother never puts

food into its mouth, as is done by a thrush or a finch. The necessity for this is obvious, for were birds which breed on the ground obliged to feed their young when they are hatched, the latter would be speedily found out by terrestrial enemies, by sight and smell, and devoured. Once they are hatched their mother leads them from the nest to feeding grounds, and conceals them among herbage. On an alarm the downy little ones separate and squat, without moving, on the ground, where their colour and appearance make them resemble tufts of moss or lumps of peat. And we may now understand why plovers and sandpipers lay such large eggs that four fill the nest exactly. It is necessary that their young should attain a higher stage of development before they break their shells than the little finches or thrushes, for the former must at once be fit to travel in search of their food and to follow their mother out of danger. Turning now to the habits of the parent birds, it is found that each species has its own breeding-season, which suits the time when there will be a food supply for its young and other suitable conditions. In February and early March the herons and ravens lay; in late March and the beginning of April the rook, the thrush, and the peregrine falcon lay; late in April the chaffinch and the cormorant; early in May the swallows and the herring-gulls; later in May warblers nest inland and guillemots lay on the cliffs; in early June, when insect life is numerous, the fly-catcher and the nightjar lay; and late in June the corn-bunting nests in the fields, the terns on marine islets, and the storm petrels in burrows and crevices in the rocks. The attachment of a pair of birds to the same site year after year is not diminished by the immense distances that some have to travel to their winter quarters. Thus the martin returns, after wintering in Africa, to breed in the globe of mud it has built under our eaves. I have known of a nightjar shot off her eggs, and the next year young nightjars were hatched within three feet of the spot, probably the offspring of the widowed bird by a second mate. This sort of thing is not uncommon. A pair of merlins will nest on the same bank in the

mountains year after year, and if one be shot the other brings a new mate next season; and even when both birds are shot another pair is found subsequently to use the old nesting site. Even the guillemot is found to deposit her egg, differing in colour from others next hers, in the same spot on the cliffs. The intelligence of birds is shown by their selection of a suitable breeding-place, and the conditions of a suitable breeding site are the vicinity of a food supply, sufficient comfort, and comparative security. To attain security most birds attempt concealment of their eggs; but many build their nests openly in places more or less inaccessible to men and quadrupeds. I may name the following various situations in which our native birds breed:—

(1)—Roofs and chimneys are used by the starling, jackdaw, swallow, and martin.

(2)—Tall trees by the rook, sparrow-hawk, and heron.

(3)—Branches and bushes by the majority of the song birds which build most elaborate nests.

(4)—Herbage on the ground is the home of the lark, the duck, and the snipe.

(5)—Burrows under ground are used by the wheatear, sand-martin, kingfisher, sheld-duck, puffin, and petrel, while hollow trees and holes in rocks and walls are nesting sites of the creepers, tits, stock-doves, tree-sparrows, and barn-owls.

(6)—Many birds nest, or lay without a nest, on the bare ground, as the nightjar, the plovers, and terns.

(7)—Among shingle and gravel are placed the eggs of the ringed plover and the little tern, without any nest.

(8)—Moors and mountain wastes are the breeding haunts of the hen-harrier, the golden plover, the curlew, and sometimes of the lesser black-backed gull.

(9)—Marshes and lakes are much frequented by water-rails and coots, by various waders, ducks, and grebes.

(10)—Islands in lakes are the favourite home of the above and of the reed-bunting and the black-headed gull;

and marine islands are the special resorts of oyster-catchers, terns, and petrels.

(11)—Cliffs have a great bird population—rock-pipits, martins, falcons, cormorants, gulls, and auks.

(12)—Sea-caves are the nesting-places of the chough and the rock-dove.

Among the various sorts of nests may be mentioned:—

Rocking or waving nests, like that of the reed-warbler, which is attached to stems of reeds that sometimes bend before the wind, while the hatching bird sits light in the very deep cup she has constructed.

Pendant nests, of which our best example is that of the golden-crested wren.

Domed nests, of which we have several, as those of the dipper, the chiffchaff, the wren, and the long-tailed tit.

Fortified nests, of which the magpie builds an excellent one, composed without and roofed above with thorny twigs that tear the intruder's hands.

Adapted nests, resembling their surroundings, as that of the dipper, which looks like a moss-covered stone in the river bank, and that of the long-tailed tit, studded with the same lichens as grow on the branch where it is built.

Floating nests, like those of the grebes, formed of aquatic weeds in the shallow water.

Some birds, like the long-eared owl, lay in the deserted nests of other birds.

Instances have often been noticed in which the chaffinch has built near the nest of the mistle-thrush, a strong neighbour which chases away the thieving magpie from the vicinity of her home, and thus defends the chaffinch too.

You are doubtless aware that the cuckoo lays in the nest of some small bird, depositing one egg in each nest, and does not rear her own offspring. What follows is remarkable. The unsuspecting foster-mother hatches the cuckoo's egg with her own, which it often resembles in colour, and from which it does not differ greatly in size. The young cuckoo is hatched blind and naked, but the day is hardly over before it feels for

its foster-brothers with the tips of its wings. It then shoulders one of them, hoists it up backwards to the edge of the nest and heaves it over. It repeats this process until it is the sole occupant of the nest and the sole object of the care of its deluded foster-mother. Once two young cuckoos were hatched in the same nest, and they spent their time trying to eject one another in this way until one succeeded.

At the conclusion of the lecture (the lantern views illustrating which were exhibited by Mr. A. R. Hogg) a number of slides showing the life-history of the young cuckoo were thrown on the screen by Mr. Robert Patterson, M.R.I.A.

Mr. William Gray, M.R.I.A., in moving a vote of thanks to the lecturer, said he had secured for his illustrations the very best slides, and he was glad to see that in that he had not overlooked the work of one of their members, Mr. Welch.

The motion was heartily carried, and the lecturer, in reply, congratulated the Club on having one who is so very able in pourtraying natural objects and natural scenes as their very distinguished photographer, Mr. Welch.

The President said they were very much indebted to the Irish Field Club Union for sending a lecturer to them in the North, and he understood they also were sending a lecturer South. It was a very valuable acquisition that the Field Clubs throughout Ireland were united together in that bond of friendship.

"RECENT PROGRESS IN IRISH BOTANY."

The third meeting of the Winter Session was held on Tuesday evening, 20th January, and was fairly well attended by members and friends. The usual science gossip half-hour was held before the regular meeting, Mr. W. H. Patterson contributing an interesting botanical exhibit, which attracted much attention. Mr. R. Ll. Praeger also exhibited a series of rare plants in connection with his paper. At eight o'clock the chair was taken by the President, Mr. F. J. Bigger, M.R.I.A., who called on Mr. W. H. Phillips to read a short paper on "The Irish Field Club Union and its Work." The

paper traced the history of the Union from its foundation in 1895 to the present day. It described the Conferences which have been held every three years (1895, Galway; 1898, Kenmare; 1901, Dublin), and the successful attempts which have been made to bring all the Field Clubs of Ireland into closer touch with each other. A most important part of the work of the Union has been arranging for an exchange of lecturers between the different clubs, no less than thirty-one lectures having been delivered under the auspices of the Union. Other matters dealt with finance and railway facilities, and the paper conveyed an excellent idea of the useful work carried on by the Irish Field Club Union. The paper, which was prepared by the Hon. Secretary of the Union, has since been published in full in the "Irish Naturalist." Mr. John Hamilton and the President spoke to this paper.

The next paper was one on "Recent Progress in Irish Botany," by Mr. R. Lloyd Praeger, M.R.I.A., a former Secretary of the Club. Mr. Praeger said that in reviewing the present state of Irish botany he referred, as was proper in a club devoted to studies in the field, especially to systematic and to geographical botany. Steady and satisfactory progress has recently been made with regard to various groups of Irish plants, and, while we should take a proper interest and pride in this advance of knowledge, it should not be allowed to blind us to the fact that for a long time back other groups of plants have been badly neglected. To take the great plant groups in order, it should be noted that little is being done in Ireland among the *algæ*, either marine or freshwater. The energies of our few workers at marine *algæ* have recently been concentrated in other directions, and a fine field remains open for the student. It is to be hoped that in connection with the work of the proposed Belfast Biological Station the seaweeds will not be lost sight of. The freshwater *algæ* are even more deserted at present, but a peculiarly bright spot in the otherwise dark landscape is furnished by the recent excellent work of Mr. William West, of Bradford, upon the *alga* flora of Lough Neagh and Donegal, the results of which have now

been issued by the Royal Irish Academy. It is interesting to note that our great Northern lake is the first in the British Isles of which the Plankton flora has been investigated. The results are full of interest, and the Belfast Club should be proud that Mr. West derived much assistance in this work from several of its members. The *fungi* and lichens are examples of great groups which have attracted but little attention in Ireland in recent years. The lichens especially have long been in need of a champion. Since Admiral Jones wandered over the Northern hills a century ago collecting these plants the group has been practically unworked. The mosses and hepatics are in a much more satisfactory state, and our knowledge of their distribution in Ireland is tolerably complete; but much detailed work remains to be accomplished, and many districts still await exploration. As regards the hepatics, the comprehensive paper which Mr. M'Ardle is preparing under the auspices of the Fauna and Flora Committee, will much advance our knowledge, and form a sound and reliable basis for future work. Northern botanists have borne their full share of the work at these interesting groups. To come finally to the flowering plants and their allies, our knowledge of the phanerogamic flora of Ireland now compares favourably with that which is obtainable regarding the flora of any country in the world. This is the result of the combined efforts of a large number of workers, whose results have been published in "Cybele Hibernica," second edition, and in "Irish Topographical Botany." In reviewing in detail the most recent progress, the date of publication of the latter work (1901) may be taken as a starting point. Taking the forty botanical divisions of Ireland and the estimated total flora which may be expected in each, we find that an average of 90 per cent. represented the state of our knowledge at the end of 1900. In the two years that have since elapsed that figure has, by the finding of over 250 plants new to the various counties, been increased to quite 91 per cent., a higher degree of working out than can yet be claimed for either England or Scotland. Mr. Praeger then referred in detail to the more

interesting plants added to the flora of the Ulster counties during the past two years, and showed specimens. Among the best finds are the following:—MONAGHAN, *Nitella mucronata*, found by Rev. G. R. Bullock-Webster; FERMANAGH, *Pyrola secunda* and *Trichomanes radicans*, found by W. N. Tetley; *Saxifraga aizoides*, by W. A. Barnes; and *Sisyrinchium angustifolium*, by J. T. Abraham; DONEGAL, *Malaxis paludosa*, found by Dr. Campbell; ANTRIM, *Carex irrigua*, found by Miss Eleanor D'Arcy, and *Spiranthes Romanzoffiana*, by Willam West, of Bradford; DOWN, *Stellaria glauca*, *Trigonella ornithopodioides*, *Trifolium filiforme*, *Artemisia maritima*, *Statice occidentalis*, *Potamogeton plantagineus*, *Chara polycantha*, by R. Ll. Praeger.

Rev. C. H. Waddell, Mr. R. Welch, and the President made some brief remarks on the paper read.

The election of two new members brought the proceedings to a close.

"RAMBLES AMONG AND ABOUT THE MOURNE MOUNTAINS."

The fourth meeting of the Winter Session was held in the Museum on 17th February, when Mr. Nevin H. Foster read a paper entitled "Rambles among and about the Mourne Mountains." The members assembled in the Museum at 7-30 for the usual science gossip half-hour, and at eight o'clock adjourned to the lecture-room. Mr. Francis J. Bigger, M.R.I.A., presided over the large attendance of members.

Mr. Foster, in the course of his address, said the Mourne Mountains form the most elevated land in Ulster, and cover an elliptical area of about fourteen miles by seven miles; thirteen of the summits rising to heights of two thousand feet and upwards. They are principally composed of a tough grey granite, which has thrust itself through the older series of ordovician and silurian strata. Signs of severe glaciation are observable in many places throughout the district, and several of the valleys contain well-marked moraines, one of the most noticeable being that which blocks the glen of the Kilkeel

River below Moonlieve, at the foot of the Happy Valley, where the new reservoir for the Belfast water supply is to be constructed. Perched blocks in many places attest the carrying power of ice. Of these Cloughmore, a block of granite (differing in composition from the Mourne granite) on the mountain above Rostrevor, is a well-known example. The ancient name of the range was Beanna Boirche, but in the twelfth century a tribe of MacMahons emigrated from Cremourne, in County Monaghan, and settled here, giving the district the name of Mourne, by which it has since been known. In the neighbourhood are to be seen several places of interest to the antiquary. The ruins of Clonduff (Meadow of the Ox) Church, below the east gable of which is a fine grave slab of the Maginess family, the remains of a stone circle on Goward Hill and Goward Cromleac (locally known as "Pat Kearney's Big Stone"), and an ancient granite stone bearing prehistoric carving of the "cup and gutter pattern" may be mentioned. The lecturer then described the ascent of some of the peaks—Slieve Donard (2,796 feet), the highest mountain in Ulster; Slieve Commedagh (2,512 feet), on the side of which is to be seen that wonderful natural structure "The Castles," formed by the peculiar vertical and horizontal jointing of the granite; Slieve Bingian (2,449 feet), with Lough Bingian perched on a sort of shelf on its side at an elevation of 1,350 feet; Slieve Bernagh, crowned, like Bingian, with massive granite crags; Eagle Mountain (2,084 feet), with its cliffs the most precipitous in the range, and beside which stands up in the Castle Bog a fine granite boss known as Pierce's Castle. About these mountains are to be observed some birds which are not usually to be seen in the cultivated lowlands. Here the peregrine falcon annually rears its brood; ring ousels on the mountain sides and water ousels along the streams are seen in fair numbers, and on some of the lower slopes those birds of very local distribution in Ireland, the whinchat and nightjar, are observed. Kestrels are plentiful, and on one occasion eight were seen together hovering over the mountain side on the lookout for food. What a pity it is that these birds are so

persecuted by gamekeepers, whose "museums" always contain a fair percentage of this species. No doubt the kestrel suffers owing to the depredations of the sparrow-hawk, a bird which will levy severe blackmail off a flock of young pheasants, so that it has become an axiom with gamekeepers to destroy every bird bearing a resemblance to a hawk, even owls—birds which, like the kestrel, subsist on mice, frogs, and beetles—sharing the same fate, while in the game interest they should be protected. Along the shore we may observe the following birds:—Wheatear, pied and grey wagtails, curlew, heron, redshank, oyster-catcher, ringed plover, common and arctic terns, gannet, razorbill, red-throated diver, lesser black-backed, common, herring, and black-headed gulls, the last-named being by far the most plentiful. Zoologist, geologist, archæologist, and botanist will find plenty to interest them in this region.

The paper was illustrated by thirty-five lantern slides, most of which were from photographs by Mr. R. Welch. At the conclusion of the paper remarks and criticisms were made by Messrs. Cunningham, Dickson, Welch, and Gray. The President brought before the meeting the desirability of all the members of the Club joining and becoming members of the Ulster Fisheries and Biology Association. This new society proposed to follow out a programme that is quite in harmony with the work of the Field Club, and offers many facilities to its members in the matter of special rates for hotel and railway travelling, special facilities for pursuing dredging operations in their steam launch, and advice and assistance in research in the Society's Marine Laboratory, under the direction and guidance of Professor Gregg Wilson. The Secretary of the new Association is Mr. Robert Patterson, Malone Park, who will give any particulars required, and who will be glad to receive the names of new members. The "Irish Naturalist" proposes to extend its interest by appointing a Northern Editor, Mr. Robert Patterson, who will be glad to receive short notes and records or articles dealing with the North of Ireland. The election of new members terminated the meeting.

"FORAMINIFERAL BOULDER CLAY FROM WOODBURN, CARRICKFERGUS."

The Club held the fifth meeting of the Winter Session on Tuesday evening, 17th March, in the Museum, College Square North. Mr. F. J. Bigger, M.R.I.A., occupeld the chair. Part of the evening was devoted to the exhibition of lantern slides dealing with Natural History and Archæology. Mr. W. A. Green exhibited views of slide-cars in the north of Antrim, and some of rock scenery on the Antrim Coast. His short description explained the salient points of interest of his brilliant slides. Messrs. Hamilton M'Cleery and George M'Lean then showed a number of slides of a dredging expedition in Belfast Lough. Mr. M'Cleery's micro-slides of the objects dredged shewed some excellent work and proved that gentleman's ability as an adept in the combined use of the microscope and camera. A series of original views of cave dwellings in the north of Spain were of interest. Mr. Robert Welch exhibited a number of slides showing the perforation of rocks by *Helix nemoralis* and elucidated a difficult and much disputed point as to the origin of certain rock markings which he had observed near Whitehead. Views of the recent floods at Limavady Junction and the destruction of cliffs at Blackpool gave evidence of the severity of last month's storm.

Mr. Joseph Wright, F.G.S., contributed a note on "Foraminiferal Boulder Clay from Woodburn, Carrickfergus." He said—The Boulder Clay at Woodburn is very fine and fairly free from stones; it is cut through by the Woodburn river at a little more than a mile N.W. of Carrickfergus, and at an elevation of about 300 feet above the sea. A few years ago a deep bed of the clay extended for a considerable distance by the side of the stream, but the greater part of it is now covered by the soil; a small portion of it is still accessible at a little above the bridge that here crosses the stream. The locality has long been notable on account of the frequent occurrence in the clay of *Leda pygmæa* and *Leda minuta* with

their valves united. The presence of these perfect *Ledæ* was known to General Portlock, and convinced him, as it did afterwards Mr. S. A. Stewart, that the Boulder Clay was a marine sedimentary deposit.

Foraminifera in Boulder Clay are usually much smaller in size than recent British species; this is what might be expected to occur in a climate so rigorous as must have prevailed during the glacial period. Several of the species, however, both here and at Knock Glen, near Belfast, are fairly large in size. The following are the most notable in this respect:—*Miliolina seminulum*, *Nonionina orbicularis*, and *Polystomella arctica*. No other locality for Boulder Clay in the United Kingdom has yielded Foraminifera in such profusion, and the clay at Knock Glen, near Belfast, has them in nearly equal numbers. At these two localities also Foraminifera have been obtained which are now only known as recent British species from collections off the West Coast of Ireland and in one or two instances from the West Coast of Scotland; some have also been obtained at a few other localities. Those found at Woodburn were *Cassidulina Bradyi*, *Lagena fimbriata*, and *Nonionina orbicularis*.

The profusion of Foraminifera at these two localities, the large size of some of the specimens, the occurence in them of West of Ireland species, the fineness of the clay and its freedom from stones, would lead us to infer that the Boulder Clays at these places were deposited in deep and quiet water, below the disturbing influence of ice action, and when marine conditions were somewhat similar to what now prevail off the West Coast of Ireland.

Amongst the rarer forms which occur are—*Bulimina elegans*, var. *exilis*, *B. minutissima*, *Bolivina obsoleta*, *B. serrata*, *Cassidulina Bradyi*, *Lagena depressa*, *L. fimbriata*, *L. castrensis*, *Frondicularia Millettii*, *Discorbina minutissima*, *D. tuberculata*, *Truncatulina reticulata*, and *Nonionina orbicularis*.

To ascertain how far floatings could be relied on for giving conclusive results, one ounce troy of this clay was examined with great care. The following table gives the result of this

enquiry; it clearly demonstrates that the process of floating cannot be relied on for proving the non-existence of Foraminifera in Boulder Clay.

Table showing the number of Foraminifera in one ounce Troy of Boulder Clay from Woodburn, near Carrickfergus, examined exhaustively by the process of floating:—

Floating.	Specimens.	Floating.	Specimens.
1st ...	1400	14th ...	5
2nd ...	166	15th ...	11
3rd ...	106	16th ...	11
4th ...	85	17th ...	7
5th ...	68	18th ...	3
6th ...	41	19th ...	8
7th ...	22	20th ...	18
8th ...	17	21st ...	6
9th ...	6	22nd ...	1
10th ...	12	23rd ...	2
11th ...	11	24th ...	2
12th ...	17	25th ...	1
13th ...	6	26th ...	0
		Total,	2032

Residue examined under microscope yielded 67 specimens.

Boulder Clay, Woodburn, Carrickfergus, weight of clay 22 lbs. troy. Foraminifera in great profusion.

FORAMINIFERA.

Biloculina irregularis, d'Orb.—Rare.
B. ringens (Lamk.).—Frequent.
Miliolina tricarinata (d'Orb.).—Rare.
M. oblonga (Montag.).—Rare.
M. seminulum (Linné).—Very common, specimens large.
M. contorta (d'Orb.).—Very rare.
M. subrotunda (Montag.).—Common.
M. tenuis (Cz.).—One specimen.
Ophthalmidium inconstans, var. *carinatum*, B. & W.—Very rare.

Cornuspira involvens, Rss.—Rare, one of the specimens very large in size.
Haplophragmium Canariense (d'Orb.).—Very rare.
Trochammina squamata, J. & P.—Very rare.
Textularia conica, d'Orb.—Very rare.
T. globulosa, Ehr.—Frequent.
Verneuilina spinulosa, Rss.—One specimen.
V. pygmæa (Egger.).—Frequent.
Bulimina elegans, var. *exilis*, Br.—Very rare.
B. pupoides, d'Orb.—Very rare.
B. marginata, d'Orb.—Very rare.
B. fusiformis, Will.—Rare.
B. elegantissima, d'Orb.—Frequent.
B. minutissima, Wright.—Very rare.
Virgulina Schreibersiana, Cz.—Rare.
Bolivina punctata, d'Orb.—Common, specimens large.
B. dilatata, *Rss.*—Rare.
B. textilarioides, Rss.—Rare.
B. plicata, d'Orb.—Common.
B. obsoleta (Eley).—Very rare.
B. serrata (Chapman).—Very rare.
Cassidulina lævigata, d'Orb.—Rare.
C. crassa, d'Orb.—Common.
C. Bradyi, Norman—Two specimens, small in size.
Lagena globosa (Montag.).—Rare.
L. depressa, Chaster.—Rare.
L. lævis (Montag.).—Rare.
L. gracillima (Seg.).—Rare.
L. lineata (Will.).—Frequent.
L. striata (d'Orb.).—Rare.
L. distoma, P. & J.—Rare.
L. gracilis, Will.—Rare.
L. sulcata (W. & J.).—Frequent.
L. Williamsoni (Alcock).—Rare.
L. semistriata, Will.—Rare.
L. squamosa (Montag.).—Rare.
L. hexagona (Will.).—Rare.

L. reticulata (Mac.)—One specimen.
L. lævigata (Rss.).—Rare.
L. lucida (Will.).—Rare.
L. quadrata (Will.).—Rare.
L. quadricostulata, Rss.—One specimen.
L. marginata (W. & B.).—Common.
L. marginata, var. *inæquilateralis*, Wright.—One specimen.
L. lagenoides (Will.).—Rare.
L. ornata (Will.).—Rare.
L. fimbriata, Br.—Rare.
L. Orbignyana (Seg.).—Rare.
L. clathrata, Br.—Frequent.
L. castrensis, Schw.—Very rare.
L. bicarinata (Terquem).—Rare.
Nodosaria radicula (Linné).—Rare, specimens large.
N. calomorpha, Rss.—Rare.
N. pyrula, d'Orb.—Rare.
N. scalaris (Batsch).—Rare.
Lingulina carinata, d'Orb.—One specimen.
Frondicularia Millettii, Br.—One specimen.
Cristellaria crepidula (F. & M.).—Rare.
C. gibba, d'Orb.—Rare.
Polymorphina lactea (W. & J.)?—Rare.
Polymorphina lactea, var. *oblonga*, Will.—One specimen.
P. gibba, d'Orb.—Very rare.
P. lanceolata, Rss.—Rare, specimens large.
Uvigerina angulosa, Will.—Rare.
Globigerina bulloides, d'Orb.—Common.
G. cretacea, d'Orb.—Frequent.
Orbulina universa, d'Orb.—Common.
Pullenia sphæroides, d'Orb.—One specimen.
Spirillina vivipara, Ehr.—Frequent.
Patellina corrugata, Will.—Frequent.
Planorbulina Mediterranensis, d'Orb.—Very rare.
Discorbina globularis (d'Orb.).—Rare.
D. obtusa (d'Orb.)—Common.
D. rosacea (d'Orb.)—Frequent.

D. Bertheloti (d'Orb.).—Rare.
D. minutissima, Chaster.—Common.
D. tuberculata, B. & W.—Rare.
Truncatulina lobatula (W. & J.).—Rare.
T. culter (P. & J.).—One specimen.
T. reticulata, Cz.—One small specimen.
Pulvinulina auricula (F. & M.).—Rare.
P. Patagonica (d'Orb.).—One specimen.
P. Karsteni, Rss.—Frequent.
P. nitidula, Chaster.—Frequent.
Rotalia Beccarii (Linné).—Rare, specimens large.
Nonionina depressula (W. & J.).—Most abundant.
N. orbicularis, Br.—Frequent, specimens large.
N. stelligera, d'Orb.—Rare.
N. pauperata, B. & W.—Rare.
Polystomella crispa (Linné).—Rare, specimens large.
P. macella (F. & M.).—Rare.
P. striato-punctata (F. & M.).—Very common.
P. arctica, P. & J.—Specimens not typical, frequent, large in size.

The remainder of the evening was occupied by Mr. James Stelfox, M.I.C.E., who exhibited a large number of excellent slides of the West Coast of Norway and Spitzbergen. Mr. Stelfox's slides showed the structure of the Fiords and Glaciers, and where the ice-foot reached the sea the formation of floes and icebergs was explained. Many of the slides suggested the conditions that obtained in Great Britain during the Glacial Period or Great Ice Age. All Mr. Stelfox's slides were of exceptional merit as combining scientific and artistic study.

ANNUAL MEETING.

The fortieth Annual Meeting of the Club was held in the Belfast Museum on Tuesday evening, 28th April, 1903, the Vice-President (Mr. W. J. Fennell, M.R.I.A.I.) in the chair. The Annual Report and the Librarian's Report were read by the senior Secretary, the Report of Botanical Section by Mr. Alex. Milligan, and the Statement of Accounts by the Treasurer, Mr. W. H. Phillips.

On the motion of the Chairman, seconded by Mr. John Vinycomb, M.R.I.A., the Reports and Statement of Accounts were adopted.

Mr. W. A. Green was awarded a prize for a set of 12 photographs sent in competition for Prize No. 23.

Mr. W. H. Phillips moved, and Mr. G. C. Gough, F.G.S., seconded, that Mr. W. J. Fennell be elected President for the coming year. Professor Symington, F.R.S., was elected Vice-President, on the motion of Mr. C. M. Cunningham, seconded by Mr. R. Welch, and Mr. W. H. Phillips was re-elected Treasurer, on the motion of Mr. T. E. Farringdon, seconded by Mr. John Cottney. The Librarian (Mr. Donaldson) was re-elected, on the motion of Mr. N. H. Foster, seconded by Mr. John Hamilton. Mr. Robert Patterson, M.R.I.A., was re-elected Secretary, and Mr. Nevin H. Foster, M.B.O.U., his colleague.

Thirteen names having been proposed for ten seats on Committee, the meeting proceeded to elect by ballot, the result being that Professor Gregg Wilson, D.Sc., Messrs. R. Welch, J. St. J. Phillips, J. Vinycomb, M.R.I.A., George E. Reilly, H. L. Orr. Joseph Wright, F.G.S., F. J. Bigger, M.R.I.A., A. Milligan, and Geo. C. Gough, F.G.S., were declared elected the Committee.

A letter was read from the Cork Naturalists' Field Club relative to a proposed "Nature Study" exhibit at the coming Cork Exhibition.

The Chairman proposed, and Mr. W. H. Phillips seconded, a vote of thanks to the outgoing Secretary (Mr. J. St. J. Phillips), who suitably responded.

The Chairman then referred in feeling terms to the retirement of two old and valued members of Committee—Messrs. William Gray, M.R.I.A., and S. A. Stewart, F.B.S., Edin. These gentlemen had greatly contributed to the success of the Club by the active interest they had taken during many years' official connection with the Society.

A discussion ensued as to the state of the Club's Library, in which Messrs. Fennell, Phillips, Reilly, Welch, Vinycomb, and Patterson took part. It was resolved that the Librarian's Report be referred to the new Committee, and that, if possible, the vacant room in the Museum should be taken by the Club.

Suggestions were then received for the Summer Excursions, and the election of four new members closed the proceedings.

RULES

OF THE

Belfast Naturalists' Field Club

(1902-3).

I.

That the Society be called "The Belfast Naturalists' Field Club."

II.

That the object of this Society be the practical study of Natural Science and Archæology in Ireland.

III.

That the Club shall consist of Ordinary, Corresponding, and Honorary Members. The Ordinary Members to pay annually a subscription of Five Shillings, and that candidates for such Membership shall first pay an entrance fee of 5/-, and be proposed and seconded at any meeting of the Club, by Members present, and elected by a majority of votes of the Members present.

IV.

That the Honorary and Corresponding Members shall consist of persons of eminence in Natural Science, or who shall have done some special service to the Club; and whose usual residence is not less than twenty miles from Belfast. That such Members may be nominated by any Member of the Club, and on being approved by the Committee, may be elected at any subsequent Meeting of the Club by a majority of the votes of the Members present. That Corresponding Members be expected to communicate a Paper once within every two years.

V.

That the Officers of the Club be annually elected and consist of a President, Vice-President, Treasurer, Librarian, and two

Secretaries, and ten Members, who form a Committee, and shall hold not less than eight Meetings in the year. Five Members to form a quorum. No Member of Committee to be eligible for re-election who has not attended at least one-fourth of the Committee Meetings during his year of office. That the office of President, or that of Vice-President, shall not be held by the same person for more than two years in succession.

VI.

The Committee may from year to year appoint a Sectional Committee as may be considered desirable to further original investigations in any one or more departments of the Club's work. Each Sectional Committee to be composed of six Members of the Club, not less than two being Members of the Club's Committee. No financial responsibility to be incurred by the Sub-Committee or any Officer of the Club without the previous approval of the Club's Committee. Any Sectional Committee may elect its own Chairman and Secretary from its Members.

VII.

That the Members of the Club shall hold at least Six Field Meetings during the year, in the most interesting localities, for investigating the Natural History and Archæology of Ireland. That the place of meeting be fixed by the Committee, and that five days' notice of each Excursion be communicated to Members by the Secretaries.

VIII.

That Meetings be held Fortnightly or Monthly, at the discretion of the Committee, for the purpose of reading papers; such papers, as far as possible, to be original and to treat of the Natural History and Archæology of the district. These Meetings to be held during the months from November to April inclusive.

IX.

That the Committee shall, if they find it advisable, offer for competition Prizes for the best collections of scientific objects of the district; and the Committee may order the purchase of maps, or other scientific apparatus, and may carry on geological and archæological searches or excavations, if deemed advisable, provided that the entire amount expended under this rule does not exceed the sum of £10 in any one year.

X.

That the Annual Meeting be held during the month of April, when the Report of the Committee for the past year, and the Treasurer's Financial Statement shall be presented, the Committee

and Officers elected, Bye-laws made and altered, and any proposed alteration in the general laws, of which a fortnight's notice shall have been given, in writing, to the Secretary or Secretaries, considered and decided upon. The Secretaries to give the Members due notice of each intended alteration.

XI.

Members of other Irish Field Clubs, residing temporarily or permanently in or near Belfast, may be enrolled Members of the Club without election or entrance fee on production of a voucher of membership of another Club, and without subscription for the current year on production of a receipt showing that such subscription has been paid to another Club. Failing the production of such receipt, the usual subscription for the current year to be paid to the Treasurer on enrolment. The names of Members so admitted to the Club to be published with the notice of meeting following the date of their enrolment.

XII.

That, on the written requisition of twenty-five Members, delivered to the Secretaries, an Extraordinary General Meeting may be called, to consider and decide upon the subject mentioned in such written requisition.

XIII.

That the Committee may be empowered to exchange publications and reports, and to extend the privilege of attending the Meetings and Excursions of the Belfast Naturalists' Field Club to Members of kindred societies, on similar privileges being accorded to its Members by such other societies.

RULES FOR THE CONDUCTING OF EXCURSIONS.

I. The excursion to be open to all Members, each one to have the privilege of introducing two friends.

II. A Chairman to be elected as at ordinary meetings.

III. One of the Secretaries to act as Conductor, or, in the absence of both, a member to be elected for that purpose.

IV. No change to be made in the programme, or extra expense incurred, except by the consent of the majority of the Members present.

V. No fees, gratuities, or other expenses to be paid except through the Conductor.

VI. Every Member or visitor to have the accommodation assigned by the Conductor. Where accommodation is limited, consideration will be given to priority of application.

VII. Accommodation cannot be promised unless tickets are obtained before the time mentioned in the special circular.

VIII. Those who attend an excursion without previous notice will be liable to extra charge, if extra cost be incurred thereby.

IX. No intoxicating liquors to be provided at the expense of the Club.



Exchanges of Proceedings.

Amiens—Memoirs de la Société Linneinne, 1892-1898.

Barrow Naturalists' Field Club.
Annual Report and Proceedings, Vols. II., III., IV., X., XIV., XV.

Bath Natural History and Antiquarian Field Club.
Proceedings, Vol. X., Part 1.

Belfast—Natural History and Philosophical Society.
Report of Proceedings, 1900-1901.

„ Ulster Journal of Archæology.
Vol. VII., Parts 2, 3, 4.
Vol. VIII., Parts 1, 2.

Berlin—Helio Abhandlungen und Mitteilungen, 1902.

Berwickshire Naturalists' Club.
Proceedings, 1899 and 1900.

Brighton Natural History and Philosophical Society.
Annual Report and Abstracts of Papers, 1901 and 1902.

Bristol Naturalists' Society.
Proceedings, Vol. IX., Part 3, 1899.

Cardiff Naturalists' Society.
Report of Transactions, Vol. XXXIII.

Dublin—Royal Irish Academy.
Transactions, Vol. XXXI., Part 12; Vol. XXXII, Parts 1, 2.
Proceedings, Vol. VI., Parts 1, 2, 4; Vol. VII., Part 2.

„ Royal Society of Antiquaries of Ireland.
Journal, Vol. XXXI., Parts 3, 4, Vol. XXXII., Parts 1, 2, 4.; Vol. XXXIII., Part 1.

Edinburgh—Botanical Society.
Transactions and Proceedings, Vol. XXXI., Parts 1, 2, 3.

„ Geological Society.
Transactions, Vol. VIII., Part 2.

Frankfort—Bericht der Senckinbergischen Naturforschenden. Gesellschaft, 1901 and 1902.

Glasgow Natural History Society (207 Bath Street).
Report and Proceedings, Vol. VI., Part 2.
„ Philosophical Society.
Proceedings, Vol. XXIX., 1899 and 1900.
Hamilton Association.
Journal and Proceedings, 1900 and 1901, No. 18.
Hertfordshire Natural History Society and Field Club.
Transactions, Vol. X., Part 9; Vol. XI., Parts 1, 2, 3, 4.
Hull Scientific and Field Naturalists' Club.
Transactions, Vol. I., No. 3.
Leeds Philosophical and Literary Society.
80th Annual Report, 1900 and 1901.
Liverpool Geological Society.
Proceedings, Vol. IX., Part 2, 1900 and 1901. Various Papers.
„ Naturalists' Field Club.
Proceedings, 1902.
London—British Association for the Advancement of Science.
Report of the Glasgow Meeting, 1901.
„ Geologists' Association.
Proceedings, Vol. XVII., 4 Parts.
„ British Museum Publications.
Catalogue of British Echinoderms.
Guide to Shell and Starfish Galleries.
Manchester Field Naturalists' and Archæologists' Society.
Report and Proceedings, 1899 and 1900.
„ Microscopical Society.
Transactions and Annual Report, 1897-98.
Marlborough College Natural History Society.
Report No. 50.
Montevideo—Museo Nacional.
Annals, Vol. III., Parts 20, 21, 22. 1902.
Norfolk and Norwich Naturalists' Society.
Transactions, Vol VII., Part 3.
Nova Scotian Institute of Science, St. John's, Nova Scotia.
Proceedings and Transactions, 1899 and 1900.
Ottawa Literary and Scientific Society.
Transactions No. 3, 1901 and 1902.

Penzance Natural History and Antiquarian Society.
Report, 1897-98.
Saint John's—New Brunswick Natural History Society.
Bulletin No. 18.
San Jose—Museo Nacional de Costa Rica.
Informe, 1897-98 and 1898-99.
Stavanger Museum.
Aarstberetning fur 1900-1901.
Toronto—Canadian Institute.
Transactions, Vol VII., Part 1.
Proceedings, Vol. II., Part 5.
U.S.A.—Boston Society of Natural History.
Vol. XXIX., Parts 15, 16. 17, 18; Vol. XXX., Part 1.
„ Chapel Hill N.C.—Elisha Mitchell Scientific Society.
Journal, 1901; Bulletin, Vol. XIII., Parts 1, 2.
„ Chicago—Academy of Sciences.
Annual Report, 1897, and Bulletin 3, 4.
„ Cincinnati, Ohio—Lloyd's Library.
Bulletin and Various Papers, Parts 1 and 2, 1901 and 1902.
„ Madison Academy of Science, Art, and Letters.
Transactions, Vol. XI., 1896-97.
„ Milwaukie—Public Museum.
Annual Report, 1897-98.
„ Missouri Botanical Gardens, St. Louis, Mo.
11th Annual Report.
„ New York—Academy of Sciences.
Annual Reports, Vol. II., Part 3.
Transactions, Vol. XIV., Part 1.
„ „ American Museum of Natural History.
Annual Report, 1901.
Bulletin, Vol. XI., Part 14; Vol. XV., Parts 1, 2; Vol. XVIII., Part 1.
„ Philadelphia—Academy of Natural Sciences.
Proceedings, 1901, Parts 1, 2; 1902, Part 1.
„ Portland Society of Natural History, Portland, Maine.
Proceedings, Vol. II., Part 5.
„ Rochester Academy of Science.
Prof. Charles Wright Dodge.
Brouchure 2, Vol IV., Part 1, and Proceedings.

U.S.A.—St. Louis—Academy of Sciences.
Transactions, Vol. X.; Vol. XI., Parts 6, 7, 8, 9, 10; Vol. XII., Parts 1, 2, 3, 4, 5, 6, 7, 8.
„ Salem—American Association for the Advancement of Science.
Proceedings of 49th Meeting, New York, 1900.
„ „ Essex Institute.
Bulletin, Vol. XXX., Nos. 1-12.
„ Staten Island Natural Science Association.
Proceedings, Vol. VIII.; Special No. 22 and Index.
„ Tufts College, Mass.
Studies No. 7.
„ Washington—Government Printing Offices.
Detached Papers by various Authors (14).
„ „ Smithsonian Institution.
Annual Reports, 1898, 1899.
„ „ United States Geological Survey.
20th Annual Report, Parts 1 2, 3, 4, 5, 6, 7, 6 continued.
21st Annual Report, Parts 2, 3, 4, 5, 7, and Atlas.
„ Wisconsin Geological and Natural History Survey.
Bulletin, No. 6.
Yorkshire Naturalists' Union.
Transactions, Parts 25, 26.



List of Members.

Any Change in the Address of Members should be at once notified to the Secretaries by Post Card.

Hon. Members.

Jones, Prof. T. R., F.R.S., 10 Ulverdale Road, King's Road, Chelsea, London, N.W.

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Corresponding Member.

Holden, J. S., M.D., Sudbury, Suffolk.

Life Member.

Ewart, Sir W. Q., Bart., Glenmachan, Strandtown.

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Berry, Dr., Rosslyn, Fortwilliam.
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Ewart, L. M. Algernon, Glenbank.

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Foster, Nevin H., M.B.O.U., Hillsborough.
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Gardner, Campbell, Jun., Windsor Park.
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Glen, George J., 30 Hartington Street.
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Greeves, W. Leopold, Bankmore Street.
Greeves, Fergus M., Forth River Mill.
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Harbison, Mann, Roskeen, Rosetta Park.
Haslett, Sir Jas. H., J.P., M.P., Princess Gardens.
Hawthorne, William, 6 Stranmillis Gardens.
Hazelton, W. D., Springfield Road.
Heron, F. A., Cultra, Holywood.
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Hogg, A. R., 13 Trinity Street.
Hoskins, A. P., Gordonville House, Rosetta Park.

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Jackson, A. T., Wellington Place.
Jaffé, Lady, Kinedar, Strandtown.

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Johnston, Miss, Annadale, Glenavy, Lurgan.
Johnston, W. P., Lynalta, Newtownards.
Johnstone, Thos. M., Queen's College, Belfast.

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Kidd, James, Brookvale Avenue.
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Kinahan, John, Low-wood, Belfast.
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Larmor, H. G., Montreagh, Lisburn.
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Letts, Prof. E. A., Dunavon, Craigavad.
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Mackenzie, Miss R. B., Carryduff.
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Malcolmson, Herbert T., Cairnburn, Strandtown.
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M'Afee, George, Corn Market.
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M'Connell, James, 2 Sunbury Avenue.
M'Connell, James, J.P., Stranmillis House.
M'Cormick, John, 81 High St.
M'Cormick, H. M'Neile, Craigavad.
M'Cutcheon, John B., Osborne Park.
M'Dermott, Rev. John, Belmont.
M'Ilroy, J. Milford, Strandtown.
M'Ilwaine, J. H., Bangor.
M'Ilwaine, Mrs., Bangor.
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M'Loughlin, John, Whitehead.
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O'Neill, James, M.A., 5 College Square East.
Orr, H. Lamont, Garfield St.
Orr, James, Garfield Street.

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Patterson, Wm. H., Victoria Street.
Patterson, Richard, J.P., Kilmore. Holywood.
Patterson, Miss Clara, Kilmore, Holywood.
Patterson, Robert, F.Z.S., M.R.I.A., M.B.O.U., Ivy Dene, Malone Park.
Patterson, Wm. H., M.R.I.A., Garranard, Strandtown.
Paul, Thomas, Redcot, Knock.
Phillips, William H., Lemonfield. Holywood.
Phillips, Jas. J., 61 Royal Avenue.
Phillips, Jas. St. J., B.E., 61 Royal Avenue.
Pim, John, J.P., Bonaven, Antrim Road.
Pim, Thos. W., 21 Victoria Street.
Pim, Joshua, Slieve-na-Failthe, Whiteabbey.
Porter, F. A., Queen's Square.
Porter, William, Beechview, Balmoral Avenue.
Praeger, E. A., Cultra, Holywood.
Praeger, R. Ll. B.E., B.A., M.R.I.A., National Library, Kildare Street, Dublin.
Prout, E., Fountain Lane.

Quail. Rev. Patrick, P.P., Dunmore, Ballynahinch.

Rankin, Will, Gordonall, Myrtlefield Park.
Redmond. David, Antrim.
Reilly, Geo. E., Woodburn, Carrickfergus.
Reilly, Alex. M., Woodburn,
Reilly, J. D., Woodburn, Carrickfergus.
Ritchie, Jas. K., 28 Eglantine Avenue.
Robinson. Samuel, 25 Donegall Street.
Russell, John, C.E., Waring Street.

Sandes, Robert, 44 Brookvale Avenue.
Savage, S. R., Woodleigh, Lisburn.
Scharff. Dr. R. F., M.R.I.A., Science and Art Museum, Dublin.
Scott, Conway, C.E., 15 Wellington Park.
Sharpe, Robt., Annaville, Knockbreda Park.
Shaw, Cecil, M.D., 16 College Square East.
Shaw. Wm. Hinde, Brooklyn, Knock.
Shaw. Launcelot, Brooklyn, Knock.
Shaw, Mrs., Brooklyn, Knock.
Sheldon, Dr. Chas., M.A., Belfast Koval Academical Institution.
Sloan, James, 6 Eglantine Place.
Small. Hugh, Sullivan School, Holywood.
Smith, Prof. Lorrain, M.D., Westbourne, Windsor Av.
Smith, Rev. W. S., The Manse, Antrim.
Speers, Adam, B.SC., Upper Sullivan School, Holywood.
Stears, Samuel M., 79 Ormeau Road.
Steele, Miss, 45 University Street.
Steele, David, 10 Royal Avenue.
Stelfox, James, C.E., Oakleigh, Ormeau Park.
Stevenson, John, Coolavin.
Stewart, Rev. J. A., Killowen, Lisburn.
Stewart, S. A., F.B.S.E., The Museum, Belfast.
Stewart, W. J., Ormeau Rd.
Strahan, J., 18 Botanic Avenue.
Swanston, Wm., F.G.S., Cliftonville Avenue.
Swanston, Mrs., Cliftonville Avenue.
Symington, Prof., M.D., F.R.S., Queen's College.

Tate. Alexander, C.E., Rantalard. Whitehouse.
Taylor, E. E., Garfield Chambers.
Thomas, S. G., Woodland Avenue.
Thompson, Ross W., Magheralave, Lisburn.
Thompson, Mrs. H., 87 University Street.
Todd, Wm. A., 24 Victoria Street.
Todd, John, Clarinda, Fortwilliam Park.
Tomlinson, W. J. C., Northern Counties Railway, Belfast.
Traill, W. A., Bushmills.
Turtle, James G., Claremont, Strandtown.

Vinycomb, John, M.R.I.A., Holywood.
Vinycomb, Bernard, Holywood.

Waddell, Rev. C. H., M.A., B.D., The Vicarage, Saintfield.
Walker, Miss, Rugby Road.
Walkington, Miss, LL.D., Strandtown.
Walkington, T. R., Edenvale, Strandtown.
Walsh. Robert, Abbotsford, Malone Road.
Wardell. Miss, St. Joseph's Terrace.
Welch, R. J., 49 Lonsdale Street.
Wheeler, Mrs., Lennoxvale, Belfast.
Wheeler, Miss O., Lennoxvale, Belfast.
Whitla, Sir Wm., M.D., College Square North.
Wilson, James, C.E., Oldforge, Dunmurry.
Wilson, James, Ballybundon, Killinchy.
Wilson, Alec. G., Belvoir Park. Park.
Wilson, W. H., J.P., Belvoir Park.
Wilson, George, 9 Bedford St.

Wilson, J. B., Evelyne Gardens.
Wilson, Prof. Gregg, D.SC., M.R.I.A., Queen's College.
Wilson, Fergus S., 4 Avonmore Terrace.
Wise, B. D., C.E., Waterside, Greenisland.
Wolseley, Charles, Ballymena.
Woollcombe, Robert L., LL.D., M.R.I.A., 14 Waterloo Rd., Dublin.
Workman, Rev. R., M.A., Rubane, Kircubbin.
Workman, W. H., M.B.O.U., Lismore, Windsor Avenue.
Wright, Joseph, F.G.S., 4 Alfred Street.
Wright, Miss, 4 Alfred Street.
Wylie, William, Mountpleasant.

Young, Robert, J.P., C.E., Rathvarna, Chichester Park.

PRESENTED
25 MAY. 1904
BRITISH MUSEUM
NATURAL HISTORY

The following Publications of the Club can be had from the Librarian.

Seventh Annual Report—1869-70, containing Appendix I., List of the Irish Liassic Fossils,—Tate, 1 Plate 2/6

Eighth Annual Report—1870-71, containing Appendix II., List of Irish Liassic Foraminifera—Wright; and List of the Fossils of the Estuarine Clays of Antrim and Down,—Stewart ... 2/6

Ninth Annual Report—1871-72 1/-

Tenth do. 1872-73 1/-

Proceedings—Series II., Vol. I,, Part I., 1873-4, containing Appendix III., List of Mosses of North-East of Ireland—Stewart; and List of Cretaceous Microzoa of North of Ireland,—Wright, 2 Plates 2/6

,, Series II., Vol. I., Part II., 1874-75 1/-

,, ,, ,, III., 1875-76 1/-

,, ,, ,, IV., 1876-77, containing Appendix IV., Recent Foraminifera of Down and Antrim,—Wright, 1 Plate; and Silurian Rocks of County Down—Swanston and Lapworth, 3 Plates 2/6

,, Series II., Vol. I., Parts V. and VI., 1877-78 and '78-'79 (in one) 1/-

,, ,, ,, Part VII., 1879-80, containing Appendix V., List of Post-tertiary Foraminifera of North-East of Ireland—Wright; and List of Mollusca of Boulder Clay of North-East of Ireland,—Stewart 2/-

,, Series., II., Vol. II., Part I., 1880-81, containing Appendix VI., List of Foraminifera of South Donegal,—Wright; Sponge Remains from Carb. Limestone, County Sligo,—Wright; and Fossil Sponge-spicules, County Sligo,- Carter, 1 Plate ... 1/6

,, Series II., Vol. II., Part II., 1881-82 1/-

,, ,, ,, III., 1882-83 containing Appendix VII., Supplemental List of Mosses of the North-East of Ireland,—Stewart 1/-

,, Series II., Vol. II., Part IV., 1883-84, containing Appendix VIII., Notes on Irish Coleopetra,—Haliday; Cromlechs of Antrim and Down,—Gray, 12 Plates; and Pre-historic Monuments near Sligo,—Elcock, 4 Plates 3/-

,, Series II., Vol. II., Part V, 1884-85, containing Appendix IX., Ostracoda of Belfast Lough,—Malcomson; Fungi of North of Ireland,—Lett; Foraminifera of "Protector" Cruise, &c.—Wright; Cretaceous Foraminifera of Keady Hill,—Wright; Irish Coleopetra,—Patterson 3/-

,, Series II., Vol., Part VI., 1885-86, containing Appendix X., (Vol. II.), The Ferns of Ulster,—Phillips and Praeger ... 2/-

,, Series II., Vol. II., Part VII., 1886-87, containing Appendix II., Notes on the Sections exposed at the Alexandra Dock, Belfast, with List of Fossils, 1 Plate,—Praeger 2/-

,, Series II., Vol. III., Part I., 1887-88, containing Appendix III., Marine Shells of the North of Ireland,—Praeger 2/-

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,, Index 6d.

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,, ,, ,, VII., 1899-1900, 1900-01, in one ... 2/-

4 APR 1905

Annual Report & Proceedings.



BRITISH MUSEUM NAT

SERIES II. PART III.

VOLUME V. 1903-04.

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PRINTED FOR MEMBERS ONLY.

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ANNUAL REPORT AND PROCEEDINGS

OF THE

BELFAST NATURALISTS' FIELD CLUB

For the Year ending 31st March, 1904.

FORTY-FIRST YEAR.)

BRITISH MUSEUM NATURAL HISTORY

SERIES II. PART III.

VOLUME V. 1903-04.

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QUEEN STREET AND COLLEGE STREET.

1904.

BELFAST NATURALISTS' FIELD CLUB

FORTY-FIRST YEAR, 1903-1904.

LIST OF OFFICERS.

President:

W. J. FENNELL, C.E., M.R.I.A.I.

Vice-President:

JOHNSON SYMINGTON, M.D., F.R.S.

Treasurer:

W. H. PHILLIPS,
LEMONFIELD, HOLYWOOD.

Librarian:

GEORGE DONALDSON,
8, MILERIVER STREET.

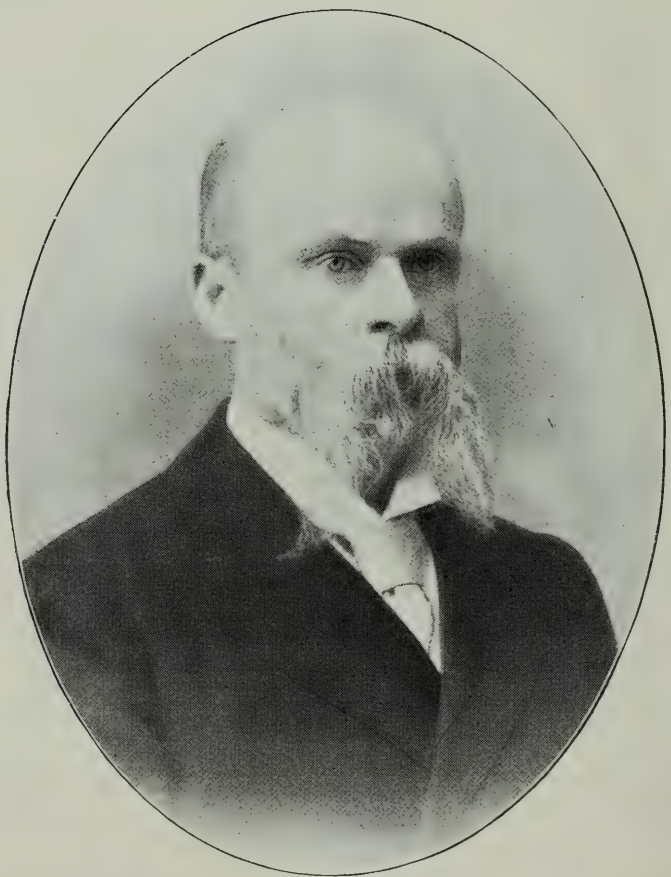
Committee:

F. J. BIGGER, M.R.I.A.
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ALEX. MILLIGAN.
HUGH LAMONT ORR.
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GREGG WILSON, M.A., D.SC., M.R.I.A.
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Hon. Secretaries:

ROBERT PATTERSON, F.Z.S., M.R.I.A., GLENBANK, HOLYWOOD.
NEVIN H. FOSTER, M.B.O.U., HILLSBOROUGH.

BRITISH MUSEUM
NATURAL HISTORY



W. J. FENNELL, C.E., M.R.I.A.I.
President, 1903-04, 1904-05.

Annual Report.

The Committee of the Belfast Naturalists' Field Club have pleasure in laying before the Society their forty-first Annual Report, which records continued prosperity during the year 1903-4. The membership, which last year stood at 312, now numbers 353, 53 new members having been elected during the year which has just closed, while 12 names have been removed from the list through death or other causes.

The Summer Excursion programme arranged at the first meeting of your Committee was fully carried out, and it is gratifying to report that the attendance of members and visitors was large, the average number present at each of the seven excursions having been upwards of fifty. The localities visited and dates of excursions were as follows:—

Port Muck	23rd May.
Strangford Lough	13th June.
Greyabbey and Ballywalter (Half-day) ..	27th June.
Sheephaven District (Long Excursion) ..	11th till 14th July.
Larne Harbour (Half-day) .. .	1st August.
Armagh and Benburb	22nd August.
Woodburn Glens (Half-day)	5th September.

Full reports of each of these excursions will be found in the Proceedings. In connection with the Summer Excursions the best thanks of your Committee are due to a number of ladies and gentlemen for kind assistance rendered—to Lady Dunleath, for admission to her well-tended aviary; to the Earl of Leitrim, to Mr. James Bruce, D.L., and General Montgomery, D.L., for permission to enter their grounds; to Rev. Michael Quinn, for allowing an examination of vestments, &c., in Armagh Cathedral; to Messrs. Lloyd, Haldane, and Mills, who courteously guided the members at Benburb; to the President and Mrs. Fennell, who entertained the party

to tea at Ballywalter; as well as to other members who assisted the Committee on several occasions.

The Winter Session was opened with a Conversazione, one of the most successful in your Club's history, held in the Exhibition Hall on 28th October, at which the attendance numbered upwards of four hundred, and the many and varied exhibits proved most attractive and instructive. The dates of the Winter Meetings and the subjects brought forward were as follows:—

1903.

17th Nov. Presidential Address—"The Club's Builders." Mr. W. J. Fennell, M.R.I.A.I.

15th Dec. "Birds, Their Structure, Flight and Habits." Mr. D. C. Campbell.

1904.

19th Jan. 1. "Varieties in British Ferns." Mr. W. H. Phillips.

2. "Some Souterrains in Antrim and Down." Mrs. B. Hobson.

3. "Birds and Nests." Mr. W. H. Workman, M.B.O.U.

4. "Notes on the Discovery of Dopplerite in Sluggan Bog.' Mr. Robert Bell.

16th Feb. "Plant Associations, with Special Reference to the Vegetation of Ireland." Mr R. Ll. Praeger, B.A., B.E M.R.I.A

15th Mar. 1. "On *Helix (Helicella) Zakkarensis*, Kobelt, a Rare Algerine Land Shell found alive near Rostrevor." Mr. R. Welch.

2. "Geology and Scenery." Mr. Geo. C. Gough, A.R.C.S., F.G.S.

3. "The Club's influence in promoting the advancement of Science." Mr. W. Gray, M.R.I.A.

19th April Annual Meeting.

At all these meetings there was a large attendance of members and friends, and previous to each the usual "Science Gossip Half-hour" was utilised for informal discussion on Natural History subjects.

The condition of your Library having been discussed at the last Annual Meeting, and your Committee instructed to take steps for its improvement, it was decided to rent from the Natural History and Philosophical Society the room in their Museum vacated by the Ulster Medical Society. This room has been suitably furnished, and your books transferred thereto and catalogued for facility of reference by members. It has been open, in charge of a Member of Committee, every Wednesday evening from seven till nine o'clock; and your Committee would express the hope that more of the members will avail themselves of these opportunities afforded

for meeting their fellow-members, as well as for giving and receiving information on the various branches of Science.

On the occasion of the King's Visit to Belfast, your Committee decided to present him with an Address. A copy of the Address and of His Majesty's gracious reply adorn the walls of the Club-room.

Your Committee's attention having been directed to the question of the preservation of Ancient Monuments under the changing conditions of land tenure in Ireland, your President ventilated the subject by means of a letter to the local press, and the Royal Society of Antiquaries of Ireland was communicated with on the matter.

Facilities to members travelling on Field Club business having been granted by the Northern Counties Railway Co., particulars were furnished in notices of June Excursions, and it is to be regretted that so few of your members have hitherto availed themselves of this privilege, obtained for them after considerable trouble.

The meagre equipment afforded in Queen's College, Belfast, for Biological study and research warranted your Committee in submitting to the authorities a statement drawing attention to the imperative necessity for further provision in this respect. A copy of this document appeared in the local papers, and letters acknowledging its receipt were received from His Excellency the Lord Lieutenant, from the Right Hon. H. O. Arnold-Forster, M.P., from Sir James Haslett, M.P., and from Mr. Thomas H. Sloan, M.P.; but notwithstanding the crying necessity, as pointed out by your Committee, as well as by other learned societies, the Government, oblivious of past promises, refuses to supply the wants of our local College.

The Club is indebted to the President and Mrs. Fennell for the opportunity afforded its members of hearing from Dr. Tempest Anderson, F.G.S., an account of his experiences whilst investigating the phenomena of the volcanic eruptions in the West Indies in 1902, which he graphically described at a Reception given by Mr. and Mrs. Fennell in the Museum,

on 2nd February, 1904, to which all your members were invited.

Your Club was represented at the meeting of the Irish Field Club Union Committee, held in Dublin on 3rd November, at which it was decided to hold the Triennial Conference at Sligo in July, 1904. Timely intimation and full particulars of this will be furnished to all the members.

Your Committee appointed Messrs. W. J. Fennell and H. L. Orr as their representatives on the Council of the Ulster Fisheries and Biology Association for 1904.

A number of your members decided on giving Mr. Wm. Gray an address and presentation on his retirement from your Committee. The occasion of Mr. W. H. Phillips' golden wedding was taken advantage of by your Committee to present him with an address. Mr. S. A. Stewart having been elected an Associate of the Linnean Society of London, your members have been asked to subscribe for the purpose of giving him an address and presentation.

The Treasurer's Report will be presented, showing a balance in hand of £42. 0s. 6d., but it must be borne in mind that a large amount of this balance will be absorbed by the printing of Reports and Proceedings for the past three years. Mr. George Donaldson will present his Report as Librarian. The Reports of the Botanical and Geological Sections, and the Report of the Sub-Committee which adjudicated on Prize Competitions will be submitted.

In conclusion your Committee would again return thanks to the public bodies and kindred societies who have favoured them with their publications during the past year, as well as to the local press for the full reports given of each meeting.

(Signed),

ROBERT PATTERSON,
NEVIN H. FOSTER, } *Hon. Secretaries.*

Report of Librarian:—

I received during the past year the usual number of Books and Pamphlets from kindred Home and Foreign Societies,

in all about 80, which I have acknowledged in the usual way. Last September, when we got possession of the room for our Library, I "commandeered" the services of a few of the young and active members of the Club, namely :—Messrs. James Orr, J. L. S. Jackson, and J. Strachan, and set them to work to get all our Books, etc., gathered together into the new room. They worked for one or two nights every week until about Christmas, by which time (with the little help I was able to give myself), we were able to get the shelves well filled with the most important Books. We then commenced to write a Catalogue, which the members will find on the table, so that any member can now see at a glance what Books we have. We have also provided another book to be used by the members when borrowing, in which to enter their own name and the name and number of the book borrowed, and when they return the same they are to mark the fact and the return date, and I hope the members will be careful to do this and so prevent any confusion that might otherwise arise.

(Signed),

GEO. DONALDSON, *Librarian.*

Report of the Committee of the Botanical Section :—

The Committee beg to report that since last Annual Meeting the work of the Botanical Section has been going on satisfactorily. The weather during the summer of 1903 was exceptionally unfavourable for outdoor work, nevertheless most of the stations of our rarer plants were visited so that a knowledge of the Botany of the district might be maintained, and made generally known to members. Amongst the finds and interesting re-discoveries with which the members of the Section are to be credited, the most interesting are two, namely: the finding of *Cardamine amara* near a stream beside Derriaghy Church, Co. Antrim, by Messrs. Richard Hanna and N. Carrothers. This is a new station for this interesting plant, which is only recorded from two other stations in Co. Antrim. A most interesting and very rare plant, *Adoxa Moschatellina*, was re-found by Mr. Wm. Porter

in the Deer Park, Cave Hill. This plant had not been seen at this station for very many years and was believed to have become extinct. It is the only station in Ireland where it is known to grow.

The Winter Session was for the most part occupied by a series of lectures by the Rev. C. H. Waddell, B.D., on the *Umbelliferæ*. Mr. W. H. Phillips contributed an instructive lecture in December dealing with the various forms of the variety *proliferum* of the Soft Shield Fern (*Polystichum angulare*).

(Signed),

Alex. Milligan, *Hon. Secretary.*

Report of the Committee of the Geological Section:—

This Section, which for some time has not been much in evidence, has set to work again with renewed vigour. Mr. James Orr was appointed Hon. Assistant Secretary, and a large number of members joined the reconstruction of the Section, and a series of half-day excursions was organised for every alternate Saturday afternoon.

On the 13th February the first meeting was held at the Queen's College, Belfast, where the members were conducted over the Geological Museum by Mr. Geo. C. Gough, F.G.S., who exhibited many of the specimens and models, and lectured on them for nearly two hours. This is the first time the Club has availed itself of the permission to visit and use the College Museum, and it is hoped that in future our members will not be strangers to it.

The second excursion was on the afternoon of 27th February to Carnmoney, where a large collection of Minerals was obtained, some of the specimens being exceedingly fine.

The third excursion took place on the 12th March, when the members assembled at Castle Junction and proceeded to the Whiterock quarries, for the investigation of the Greensand and Chalk sections, which yielded some fine fossils. These sections were photographed at close quarters, and some good records obtained. When in the quarries Mr. George C.

Gough lectured on the origin of the Chalk and especially on the formation of the flints found in same. On the return journey a visit was paid to the exposure of Keuper Marls in Ballymurphy Brickworks. Here some fine photographs were obtained by Mr. Welch of a remarkable section of numerous veins of gypsum *in situ*, as well as of two dykes which traverse the Marls.

The last excursion was held on the 26th March to the quarries at Scrabo, where Mr. William Gray, M.R.I.A., explained the different points of interest, and the well-known quarries yielded some good specimens. These Winter Excursions proved a remarkable success, and it is the intention of the Committee to have at least one excursion of the Section every month during the Summer Session.

The President and Committee of the Section desire to express their gratitude and thanks to their energetic Secretary, Mr. James Orr, to whom the success of the organising is largely due, and to Mr. Gough for the valuable assistance he has rendered and for the information which he gave so freely in the field, making the excursions of more than ordinary value and interest to the students of Geology.

(Signed),

James Orr, *Hon. Assist. Secretary.*

Report of Sub-Committee on Prize Competitions:—

The Rev. Geo. Foster, of Lurgan, submitted for Competition No. 10 a collection of local *Lepidoptera* to which we have pleasure in awarding a prize. The collection shows that considerable time and care have been taken in collecting and mounting the specimens, but we feel that the general appearance would be improved if smaller pins had been used, especially in the case of those used for the labels. The number of Butterflies in the collection was rather disappointing. The value of the exhibit is much enhanced by the catalogue with careful notes of localities, times of capture, and remarks, which accompanies the specimens.

Competition No. 17.—In competition for this prize Mr. Nevin H. Foster has sent in a collection of Ferns. This collection consists of 10 large sheets, and comprises specimens of 8 species of the local Ferns, and includes a number of good examples of the abnormal forms or sports so much valued by Pteridologists. The fronds are mature, mounted and displayed at full length, and constitute a very nice series of these plants, and accordingly we award this prize to Mr. Foster.

(Signed),

S. A. Stewart,
Geo. C. Gough,
R. Welch.

ADDRESS TO THE KING.

To His Most Gracious Majesty Edward the Seventh,
Of the United Kingdom of Great Britain and Ireland and of the British Possessions beyond the Seas, King, Emperor of India.

May it please Your Majesty,

We, the President and Committee of the Belfast Naturalists' Field Club, desire on behalf of the Club to offer our most respectful, dutiful, and loyal welcome to the City of Belfast.

We rejoice that on this occasion your Majesty is accompanied by Her Majesty the Queen, to whom we also offer our most loyal and hearty welcome.

Knowing the great interest your Majesty has invariably taken in all branches of scientific research, we feel a pride in being permitted to approach your Majesty, as the Premier Field Club of Ireland and the one with the largest membership. Our Club was founded on the 6th of March, 1863—exactly four days previous to your Majesty's happy marriage—and has contributed in no small degree to the advancement

of Science in this portion of your Majesty's Kingdom during the forty years that have elapsed.

We sincerely hope that your Majesty may be long spared in health and strength, to reign over a happy, united and prosperous people.

Signed on behalf of the Belfast Naturalists' Field Club,

W. J. Fennell, *President.*
Robert Patterson, } *Hon. Secretaries.*
Nevin H. Foster, }

27th July, 1903.

HIS MAJESTY'S REPLY.

Gentlemen,

I accept your loyal and dutiful greetings with unfeigned pleasure. Our warm welcome to Belfast on our last visit is still a vivid memory with myself and the Queen. I am glad to think that the lapse of time, so far from diminishing, has deepened your friendly feelings towards us.

Your reference to my beloved mother, and to her gracious influence upon public life at home and abroad, awakens sad but stimulating memories. My highest ambition is to follow in her footsteps, and, like her, to make the good of my people, the prosperity of the realm, and the maintenance of peace amongst the nations, my constant aim.

I am pleased to hear of the steady progress in the manufacturing and commercial enterprise of this great centre of industry, and of the increasing prosperity of the important district of which it is the capital. The staple trade of Ulster has long since given to Belfast and its neighbourhood a world-wide reputation; but great industries of more recent growth have attracted and now maintain a teeming population. They have enhanced the fame alike of your far-seeing captains of industry and of your intelligent artizans. It is of good omen for the future that your chief hope for the maintenance and extension of your trade and commerce should be based upon the provision of improved facilities which will give a

better and more practical training to the minds and hands of your people.

I am well assured also that the independent spirit of self-help which has distinguished your past will not be wanting in the future. I share in your legitimate pride at the position which Belfast has won among the cities of my Empire; and I pray that, by the Divine blessing upon your varied labours, the future of this great city, of the important towns in its neighbourhood, and of the wide district of country which is represented here to-day, may be one of ever-increasing progress and prosperity.

EQUIPMENT OF QUEEN'S COLLEGE, BELFAST.

The Committee of the Belfast Naturalists' Field Club—an organisation for Field work and research in the Natural History of the North of Ireland, having over 350 members—desire to call the attention of the Government to the pressing need there is for increased endowments and additional buildings at Queen's College, Belfast. Many departments of Natural and Physical Science there are seriously crippled by want of funds and additional teachers, but it is with the Natural History department that this Committee is chiefly concerned. It is a physical and mental impossibility for any one man to *adequately* instruct large classes in Botany and Geology and Zoology and at the same time act as Curator of the valuable Museum housed in the College. Professor Huxley pointed this out in 1870, and if he considered it impracticable then, how much more impossible is it now, when every year brings important discoveries and advances in each of these widely divergent subjects. The Committee would respectfully urge that a Chair should be established for each of these subjects at the earliest possible moment.

Another urgent need is a Laboratory, where practical Biology and original research could be carried on. At present there is no provision for research in Natural Science

and many members of this Club are anxiously waiting to be given the means of carrying on investigations in different branches of Science, such as a properly equipped Biological Laboratory would afford.

The Committee feel strongly that Belfast has been neglected in these matters, and urge the prompt fulfilment of past promises on the part of the Government.

(Signed),

W. J. Fennell, *President.*

Robert Patterson,
Nevin H. Foster, } *Hon. Secretaries.*

STATEMENT OF INCOME AND EXPENDITURE for the Year 1st April, 1903, till 31st March, 1904.

Dr.

To Balance from last year	£34	14	7
,, Subscriptions	83	5	0
.. Entrance Fees	12	0	0
,, Receipts—Conversazione	17	14	0
,, Books Sold	0	8	0
,, Balance from Excursions	3	12	0
	£151	13	7

Cr.

By Printing, Stationery, and Advertising—					
Advertising	£0	16	1		
Printing Certificates ...	1	12	6		
Stationery for Club Room ...	1	3	0		
Typing	1	19	8		
Whig A/c. (for 18 months) ...	25	16	7		
				31	7 10
,, Expenses of Conversazione				16	5 6
,, Rent of Museum				14	13 0
.. Commission to Collector				2	19 10
,, Donation to *Irish Naturalist*				2	0 0
,, ,, Irish Field Club Union ...				2	2 0
,, Expenses of Lectures				3	2 2
,, Postages				20	10 0
,, Gas				1	7 9
.. Prize				0	10 0
.. Insurance				0	10 0
.. *Ulster Journal of Archæology* ...				0	5 0
,, Furnishing Club Room				12	19 0
.. Illumination (J. Vinycomb)				1	1 0
.. Balance in hands				42	0 6
				£151	13 7

(*Signed*), W. H. PHILLIPS, *Hon. Treasurer.*

Proceedings.

SUMMER SESSION.

PORT MUCK.

The first excursion of the Summer Session took place on Saturday, 23rd May, when fifty-two members assembled at the Northern Counties terminus at 9-45 to proceed *via* Larne to Port Muck, Islandmagee. During the journey down a fine specimen of the cuttlefish (*Eledone cirrosa*), captured the previous day in Belfast Harbour, and kindly presented by Mr. W. Redfern Kelly, C.E., to the Larne Marine Laboratory, was exhibited and discussed. Immediately on arrival at Larne Harbour the whole party crossed to Islandmagee, where cars were in waiting, which were used by some of the ladies, and which also carried the provisions, cameras, and collecting-bags of all sorts. The greater number of members preferred to walk, and soon the botanists were at work, the temptation to linger being very great. It was an ideal day for a walking excursion, the gentle breeze off the sea tempering the heat of the sun, while all around the chorus of many birds—stay-at-homes like thrush, blackbird, and lark, and welcome visitors like cuckoo, corn-crake, whitethroat, and willow-wren—added another charm and gratified another sense. Presently the road, fringed with great masses of Alexanders (*Smyrnium Olusatrum*) in flower, was left, and a field-path taken through farms and over the gentle hills, until suddenly we found ourselves looking down on our destination, Port Muck, with its white rocks, its white shingle of rolled flints, and its white houses glistening in the sun. A narrow strait divides the Island of Muck from the mainland,

and the receding tide was just showing the ridge of the natural causeway which at low-water forms a footway to the island, and which looked much easier to traverse than it actually proved later on. Leaving the neat coastguard station on the left, the party descended to Port Muck, and an old ruin on the edge of the cliff was investigated. There is little left to guide one, but its formation points decidedly to that of martial structure, and seems to indicate the lower chambers of a small, square keep, which was once surrounded by outworks of fairly considerable magnitude. One feature remains which has been called a "water gate," but evidently was an exit for refuse. The keep is now used as a shed for wheel-cars, three of these quaint old vehicles in a picturesque group being photographed by various members. Later in the day the site of the old Abbey with its graveyard was visited, and remains of some stone-lined graves inspected, with human bones *in situ*, the only trace visible of a religious foundation of which the late Bishop Reeves says:—"In 1589 the Rectory of Rincheven, alias Portmucke, was leased to the Earl of Kildare as an appurtenance of the Abbey of Inch. At the foot of a rock close to the shore, yet sheltered from the eastern blast, stood the church of Portmuck, of which the only remaining part is a portion of the east wall. The graveyard was ploughed up some years ago by the holder of the surrounding farm, and at the same time the foundations were cleared away. They are stated to have been about sixty feet long and twenty wide." The portion of the "east wall" referred to has now also disappeared.

The party then proceeded to the beach, and, as it was low-water, the majority were enabled to walk across the boulder causeway to Muck Island, not, however, without various slips and falls, and consequent wet feet. Others took advantage of the kindly offer of the local coastguards, who placed their boat and themselves at our service, and, wading in the shallow water, carried the ladies in a more or less unconventional manner to the boat. When all had reached the island in safety lunching groups were recorded

by the cameras. Then the serious work of the day was begun, and the party separated to explore the island thoroughly. While some collected in the rock-pools and among the sea-weed, others ascended to the top of the island (110 feet), and watched the numerous birds on the cliffs and sea-stacks, and the botanists made the most of their time, as shown by a list of twenty species of marine *algæ* (including *Conferva erecta*) and many land plants, *Asplenium marinum*, *Ophioglossum vulgatum*, and *Botrycium lunaria* being the best finds of the latter. The following birds were found to be nesting on the island:—Herring-Gulls, Jackdaws, Rock-Pipits, Lapwings, and Martins, while information was obtained of Sheld-ducks having had a nest there this season. The rarest bird observed was the Manx Shearwater, a pair being seen on the eastern side of the island, where they probably breed. Altogether forty-seven species of birds were noted during the day by the ornithologists of the party. The rock-pools yielded several species of amphipods and isopods, fishes of the ordinary shore kinds, crabs, and many other marine animals, and good collections were made. On the highest parts of the island those curious pellets cast up by the gulls were found, some consisting wholly of bones and teeth of fish, others containing remains of rat, rabbit, mouse, and innumerable crabs, with a few wireworms, while the numerous wing-cases and legs of beetles in others proved the gulls to be good friends to the farmer. The day was too dry for land-shell collecting, but six common species were found on the island, including the white form of *Helix rotundata*, which seems to be as rare in Ireland as the type is common. The marine shell *Trochus helicinus* var. *fasciata* was found in quantity on the centre of the causeway, and seemed to be spawning there. The variety is rare here, almost the only recorded locality being Portrush in 1898 (Nichols). Altogether twenty-seven species of beetles were collected, one little pond alone yielding five species. The steam launch of the Ulster Fisheries Association came round from Larne, and did some dredging in the neighbourhood of Port Muck, the members watching the

operations with great interest. At half-past three the coast-guards took the entire party back to Port Muck, as the causeway had disappeared under the incoming tide. Here some time was spent investigating the outcrop of Greensand, many characteristic fossils being obtained by the geologists of the party. Fine new examples of snail borings under ledges of the chalk cliffs were found here, with specimens of *Helix aspersa* sheltering in them. In some cases clusters of the holes were found together, and these were well photographed. As stated above, the return journey was begun, some going by cars and the rest walking. Those who crossed in the first ferries paid a visit to the Marine Laboratory of the Ulster Fisheries Association, being shown over the house by a member of the Association who was working there. At 6-30 all were enjoying a well-earned and most welcome tea in the Olderfleet Hotel, after which a short business meeting was held—the President (Mr. W. J. Fennell, M.R.I.A.I.) in the chair—at which the following were elected members:—Miss Holland, Miss F. H. Whitaker, Miss Rentoul, Mrs. N. H. Foster, Messrs. Hugh Cochrane, Walter Gabbey, Robert Cromie, Wm. R. Pim, and Thomas Thornton. It was announced that Miss Massey, a member of the Dublin Field Club, had kindly sent a box of small marine shell *debris* from the Malahide Estuary for distribution among the conchological members of the Belfast Club, and this was much appreciated by them. The 7-25 train was taken at Larne Harbour, and Belfast reached at about 8-30.

STRANGFORD LOUGH.

The second excursion took place on Saturday, 13th June, to Strangford Lough, when members and their friends, numbering upwards of fifty-five, assembled at the County Down Railway Station, and left by the 9-35 a.m. train. On arrival at Crossgar the party proceeded to the brakes and cars in waiting, and were soon comfortably seated thereon, and in a very

few minutes were bowling along the undulating road leading to Killyleagh. In the course of our drive through this fertile district the neatness and taste exhibited in the farmhouses and cottages attracted much attention, and the vivid colouring presented by the broom was much admired. By the side of the road was observed a rather remarkable rookery; here the nests were placed in low fir bushes, contrary to the usual nesting practice of rooks, which is to rear their young in the slender branches at the tops of high trees; and a little further on the peculiar spectacle of a large grass field studded all over with white-thorn bushes was commented on. Fields of this sort may be seen in game-preserving localities, the reason for having them planted over with bushes being to defeat the netting proclivities of poachers, but here it is more likely that the haw kernels had been scattered by members of the thrush family after taking from them their nutritive envelopes, and had vegetated in the fertile soil.

Our arrival in Killyleagh had evidently been anticipated, and many of the inhabitants were standing outside their doors, who greeted us with friendly cheers as we drove through their streets to the quay.

Killyleagh must always be held in reverence as the birthplace, in 1666, of Sir Hans Sloane, the eminent physician and naturalist, and founder of the British Museum. Sir Hans Sloane was President of the Royal Society from 1727 till 1741; he died in 1753, and bequeathed to the nation his entire collections, which form the nucleus round which the vast treasures of our national Museum have since aggregated. On reaching the quay our embarkation was speedily accomplished, but the weather, which up till this time had not been unfavourable, now changed, and soon the strong north-westerly wind, blowing almost directly in our faces, very much impeded our progress up the lough, and necessitated frequent tackings to enable us to make any progress northwards. About a mile and a half out from Killyleagh we passed close by Dunnyneill Island (*dun-ui-Neill*, O'Neill's fort). Unlike most of the islands in the lough, which are

generally low whale-backed islets, this island rises from the water with precipitous sides, and the steep scarp has been artificially completed to form a high circular rath. Tradition informs us that here the Kings of Ulster kept safely the hostages obtained in their many battles; and a layer of blackish earth exposed in the face of the steep bank, in which are embedded fragments of bones and shells, points to its having been inhabited in early times, but the only observable occupants as we passed appeared to be Sheld-ducks, Red-breasted Mergansers and Oyster-catchers, for which this island affords a tolerably secure breeding-place. Passing up through the archipelago, we raised large numbers of Common and Arctic Terns and Ringed Plovers, which, with the birds above mentioned, nest freely on these islands, and the graceful flight of the Terns frequently elicited expressions of admiration when contrasted with the heavier appearance of the Common and Herring Gulls, which were also flying about and resting on the rocky islets in considerable numbers. Two boat-loads landed on the peninsula of Ringhaddy (*rinn-fhada*, the long point) to inspect the ruins of the castle (which like most of the Strangford Lough castles, appears to be of Anglo-Norman origin, but to have been inhabited up to a much later date than many of the others), and of the old church on the hill above it, the cameras being soon busy at both ruins; the botanists and zoologists meanwhile finding much to interest them along the shore. But Mahee Island, the Mecca of our pilgrimage, was now in the near foreground, and all efforts were put forth to effect our landing, which was at length accomplished, and, after the long sail, the lunch baskets were requisitioned and their welcome contents partaken of on the shores of this historic island. Soon the shore collectors were busy at work, and many specimens of the stalk-eyed and sessile-eyed crustacea were added to the contents of the collecting bottles; among the latter section the amphipod, *Orchestia littorea*, was observed to be very plentiful, and many fine specimens of the largest of our British isopods, *Ligia oceanica*, were obtained. In the water by the landing-place

some beautiful jelly-fish were floating about, and some specimens were secured. We were now called to inspect the ruins for which this island is famous, and after a short walk were soon standing beside the castle, on the northern shore. This castle, overlooking a causeway which crosses to Reagh Island, was probably one of De Courcy's numerous strongholds, and appears to have been of considerable extent; the course of the staircase in its north-west corner can still be observed, and the foundations of walls traced for considerable distances around it. However, it is the ruins of the ancient ecclesiastical colony of Nendrum or Nedrum (*n'oendruim*, one hill), that specially claimed our attention, and thither we soon wended our way. These ruins crown the slope of the western side of the island, and from the summit of the ivy-mantled base of a Round Tower a lovely scene was presented to our vision. Northward we saw Scrabo Monument and Helen's Tower, backed by the Belfast mountains. Eastward and southward the lough, studded with picturesque islands, lay bathed in sunshine, backed in the east by the high lands of Ards peninsula; while far to the south we saw some of the summits of the Mourne mountains, of which Donard, Commedagh, Meel-beg, and Bernagh stood out conspicuously, and rising behind the fertile hills of Killinchy we observed that ancient granite mountain Slieve Croob (*Sliabh crub*, the mountain of the hoof), whose springs furnish the sources of the River Lagan. After admiring this lovely view, we were called to learn from our President (Mr. W. J. Fennell, M.R.I.A.I.) something of the history of this settlement, and in the course of his remarks we were informed that the name of the island —Mahee Island—is a corrupt form of Inis-Mochaoi, the Island of St. Mochoe, one of St. Patrick's early converts, who died about A.D. 490, and was probably buried in the island which witnessed his labours and has ever since borne his name. Our attention was also called to the fact that the founders of this early Christian settlement chose a site with such a commanding outlook, in contrast to the church settlements of later times, which were placed in more retired situations.

There is little left of these ruins, apart from the deep interest that must attach to one of the earliest Christian sites in the country, to arouse antiquarian enthusiasm. The foundations of a Church measuring about 58 feet by 22 feet may be traced, and a little to the north of it stands the base of a Round Tower, and the foundations of a number of walls have been discovered adjoining, while the whole is enclosed by several faint concentric ramparts of earth. There is no doubt that this place would amply repay the labours of some competent excavator, as very little in this way is known to have been done beyond some preliminary observations by the late Dr. Reeves in 1844. But our time here had now expired, and we embarked to rejoin the other members of our party, whom, by the aid of our glasses, we could observe at Ballydorn Quay, the strong currents having obliged them to give up the attempt to land with us, and as we were putting out from Mahee Island we had a forcible illustration of the aptitude of the Norse name for the lough—Strangford (*Strang Fiord*, the violent inlet, probably on account of its rushing tides)—as we watched the efforts of one of the boats, which, though four oars were ably manned, failed to make the slightest headway against the strongly-running tide, but was obliged to turn back and make with us for Ballydorn Quay, on the island opposite which stand the remains of Sketrick Castle (*Sgath derg*, red shadow), one of the strongest of the twenty-seven fortresses built by the Anglo-Normans at Strangford Lough after John De Courcy's invasion in the year 1177 A.D. Till lately this castle stood tolerably complete, but in 1896 the south-western angle fell with a great crash one spring day. The portion which remains is much fissured, and will probably not long survive. At Ballydorn Quay we found brakes in waiting, and were soon driving merrily along the hilly road to Comber, where we were refreshed, after a long day's exertions, by the tea provided for us. During the day forty-one species of birds were reported as being observed. The botanical members of the party did not report any rare species as having been found, but many interesting plants were

collected, the gravelly shores of Sketrick Island yielding some good shore-loving plants just coming into flower, and the "variation to suit environment" of others was noted, as in the case of the wind-cut and dwarfed sea-pinks on some very exposed flat areas. It had been intended that some dredging should be carried out, but this was found to be impracticable owing to the strong-running tide and fierce head-winds encountered. After tea had been partaken of, a start was made for Comber Station, where the party arrived in good time to take seats in the carriages reserved in the 8-2 train, and duly arrived again in Belfast shortly after half-past eight o'clock.

GREYABBEY AND BALLYWALTER.

(Half-day Excursion.)

The third excursion took place on Saturday, 27th June, to Greyabbey and Ballywalter, when, despite the unfavourable meteorological conditions prevailing, upwards of sixty members and friends assembled at the County Down Railway Station, and proceeded to the carriages reserved for them in the 1-35 train, and on arrival at Newtownards, where brakes were in waiting, we were soon comfortably seated for the drive to Greyabbey, our first stopping place. Passing through Newtownards, we noted the remains of the old town cross, an octagonal structure of Scrabo sandstone, on which is an inscription, now almost obliterated, stating that the cross was erected in 1636, was thrown down by the rebels in 1653, and that as much of it as could be recovered was replaced in the present form in 1666. After leaving Newtownards the road runs close alongside Strangford Lough, and on the shore we saw the "Butterlump" Rock, a huge block of black basalt, estimated to weigh about 130 tons, perched on a bright red bed of Triassic sandstone, an attestation of the carrying power of the ice streams of the glacial epoch. The road skirts the Mountstewart Demesne, and we noted the blighted appearance of the whitethorn, a plant which evidently objects to its

proximity to the sea, and a couple of miles further on we arrived at Greyabbey, where all descended from the vehicles for an inspection of the beautiful ruins. The party was conducted through the remains of the Abbey by the President (Mr. W. J. Fennell, M.R.I.A.I.), who pointed out the vairous features of interest, and informed us that it was founded in the year 1193 by Affreca, daughter of Godred, King of Man, and wife of John De Courcy, who placed in it a contingent of Cistercian monks from the Abbey of Holm, in Cumberland. "It mingled in the burning questions of progress and politics that then, as now, were convulsing the country, as its growing history required reform. It lived, it grew, and had its time of great prosperity in those early days. It saw strange and stormy times, when rapine and disorder, battle and murder raged and tore the very heart of the land. It suffered from plundering hordes, from sacrilege and fire ; and, lastly, it saw the dissolution which ended its work, its hopes, its struggle for man's advancement, its kindly help. Its faults and errors were over, scattered for ever was the great fraternity, and the Cistercian Brotherhood was no more—was 'like a tale that is told.' Little remains now to tell its history except some portions of the local habitation that have braved the storms of seven hundred years, and have escaped the ignorant hand of the spoiler, and now, 'white with age and hoary with antiquity,' these are kindly cared for and preserved as a record in stone, a monument of a past age, and of the gentle Lady Affreca and the work she founded, and of the place where she was laid with hope of rest.* Her recumbent effigy, with the hands in the attitude of prayer, carved in grey freestone, was erected beside the high altar, but is now in the chancel, beside that of her husband, which has the legs crossed, showing that he had been one of the Crusaders. The buildings which comprise the Abbey bear in their grouping a similarity to the planning of all the houses of this Order, the chief features of which are the cloister garth, a large rectangular garden, round the four sides of which the buildings range themselves, the north side being occupied by

* From a paper on Greyabbey by W. J. Fennell.

the church, which is in the shape of a Latin cross, with its smaller chapels branching off the east sides of the arms or transepts. In the south transept we have the remains of a winding stair, communicating directly with the dormitories, which ranged themselves southward over the sacristy, chapter-house, and calefactory, which compartments are plainly seen by the remains of their walls, now only a few feet high. The chapter-house has an especial interest, and was a well-proportioned room of thirty-seven feet long by twenty-eight feet wide, being divided into bays by two rows of three columns each, which supported a ceiling of groined vaulting; all the bases of these columns remain *in situ*, while many stones of well-preserved groins are to be found alongside them. The chapter-house was divided from the dayroom by a slype or passage. The dayroom must have been "ceiled" like the chapter-house, and it ends the range of buildings on the east side, and branching from it at right angles we come to the kitchen and the refectory, which close the south side of the garth. The refectory was a noble, lofty hall, and still retains its stately group of three lancet windows. On the west side of the refectory is a narrow stair in the thickness of the wall, leading to the pulpit, which projected like an oriel from the wall into the room, and which was invariably occupied by one of the Order, who read the Scriptures while his brethren indulged in their frugal fare. The buildings, which at one time enclosed the west side of the garth, have now disappeared. Here, as in other houses of the Order, were placed the buttery, the almonry, the gatehouse, and the guests' house. The Abbey flourished till towards the middle of the sixteenth century, the last record we have of the establishment in its entirety being dated 1541, when John Cassels was abbot. Two years later the place which for three centuries and a half had sheltered the austere and white-cassocked Cistercian monks was derelict, and there can be no doubt that the Abbey shared, at the hands of Sir Brian M'Phelim O'Neill thirty years later, the fate of the neighbouring abbeys of Bangor, Movilla, and Comber; its only

inhabitants now being the starlings and jackdaws, which find secure nesting-places among the chinks afforded by its ruined walls, on which was also observed that rather rare plant the pellitory of the wall (*Parietaria officinalis*). Several cameras were employed, and views of the Abbey from different standpoints taken, and a resolution was passed calling attention to the overgrowth of ivy, which threatens to destroy the ruins. We were called to resume our drive across the Ards Peninsula to Ballywalter, where by kind permission of Lady Dunleath, we were conducted over her celebrated aviary, containing a fine collection of living birds from all quarters of the globe, among which are included canaries, whydaks, tanagers, saffron, zebra, bull, gold, indigo, mountain, grey African, Bengalese, painted and gouldian finches, spice birds, golden-breasts, silver-bills, avadavats, Indian bulbuls, waxbills, cut-throats, nuns, doves, lemon-crested and rosy-breasted cockatoos, red-rumped, half-moon, and Indian green parakeets, cockateels, silver and golden pheasants, Californian quails, zebra doves, red-crested, green and Pope's cardinals, Virginian nightingales, weaver birds, nonpareils, silky cowbirds, American mocking birds, Nicobar pigeons, Peking robins, rheas, cranes, flamingoes, wild-ducks, sheld-ducks, Canada geese, peafowl, and Guinea fowl; the brilliant colouring and graceful movements of some of these birds eliciting many expressions of admiration. The arrangements of the aviary for the comfort and well-being of the inhabitants were favourably commented on, and we were pleased to learn that only one or two of them had suffered during the winter, provision being made for keeping the houses, to which the birds can retire at will from their netting-enclosed forest demesne, at a suitable temperature; our only regret being that the time at our disposal was so short (the ornithological members of the party maintaining that weeks of study would not exhaust its interest); and as we resumed our places in the vehicles we noted the nests of the martins under the house-eaves, and were soon *en route* for the quaint and picturesque Dunleath Arms Inn. Here we were entertained to tea by

the President and Mrs. Fennell, the catering of Mr. and Mrs. Blackburn, managers of the inn, being such as elicited many promises of future visits from the members. Ample justice having been done to the good things provided, a short business meeting was held, and a vote of thanks passed to Lady Dunleath for her kind permission to inspect the aviary, and six new members, Mrs. A. Morrison, Messrs. A. Morrison, S. Shannon Millin, D. C. Campbell, H. Horner Mayne, and Hugh Maybin, were elected. On the motion of Dr. Sheldon, seconded by Mr. William Swanston, and supported by Mr. William Gray, a vote of thanks was accorded to Mr. and Mrs. Fennell for their generous hospitality. Punctually at six o'clock a start was made for Donaghadee, which was reached in good time to take seats in the reserved carriages attached to the train, and Belfast was reached at half-past eight o'clock, where the members separated.

SHEEPHAVEN DISTRICT.—(NORTH DONEGAL.)

(Long Excursion.)



THE excursion to which the Members look forward with the keenest interest is known as the "long excursion," and is generally timed to take place in the middle of July, when festivities of another kind give an opportunity to many of the Members to indulge in a holiday. This year was no exception to the rule, and on the morning of Saturday, the 11th July, forty-four members and visitors met at the Northern Counties Railway Terminus in Belfast, and at 8 a.m. started for Sheephaven Bay, in North Donegal.

On the run to Derry every object of interest was pointed out, and the "flooded area" came in for much attention, as well as the field in which the now famous "gold ornaments" were

found. We might mention here that some of the most important evidence taken at the present "treasure trove" trial was collected and given by members of the Club, whose keen powers of observation and timely recording of the same in a great measure secured the desired end—that the "ornaments" should be restored, as they now have been, to their home in Ireland.

Arriving in Derry, the city was crossed, and the train was taken to Creeslough; on the way some of the more active members making a hasty visit to the "walls," and taking the visitors with them. At twelve o'clock all were once again entrained and on the way to Donegal.

The country passed through seems to bear the impress of prosperity, and in the splendour of the summer sun which favoured us it was as though nature had scattered plenty over a smiling land with generous profusion. We had heard of the poverty of Donegal, but in its garden of peace and plenty we failed to see it. As a matter of fact, our tour seemed to be in districts singularly free from dirt and poverty, with their attendant evils, and our experience brought us into contact with well and comfortably dressed people, possessed of that bright, cheerful light-heartedness which is not known where poverty, depression, and wrong reign and oppress.

Approaching Burnfoot Station, where the county of Donegal is entered, we could see, crowning a hill 800 feet high, the "Grianan of Aileach," "a ring of cyclopean masonry 75 feet in diameter, the walls being 18 feet high and over 12 feet thick at the base. Inside this huge wall from each side of the entrance gate galleries run, with exits, on to the enclosure." Its history goes away back through ages of legend and tradition, but no mention of it is found in our annals until early in the fourth century. After being plundered several times, it was finally destroyed in 1101 by Murtagh O'Brian, King of Munster. The antiquaries of the party much regretted that time did not permit of a closer inspection. A short stay was made at Kilmacrenan Station, where great interest was aroused as the peasantry were on

the platform in great numbers, returning from a "pattern," and laden with bottles of holy water from the celebrated well of Doon. They were happy and vivacious, and seemed pleased with the passing interchange of courtesies. All carried with them that air of comfort which appealed so happily to us during our entire visit.

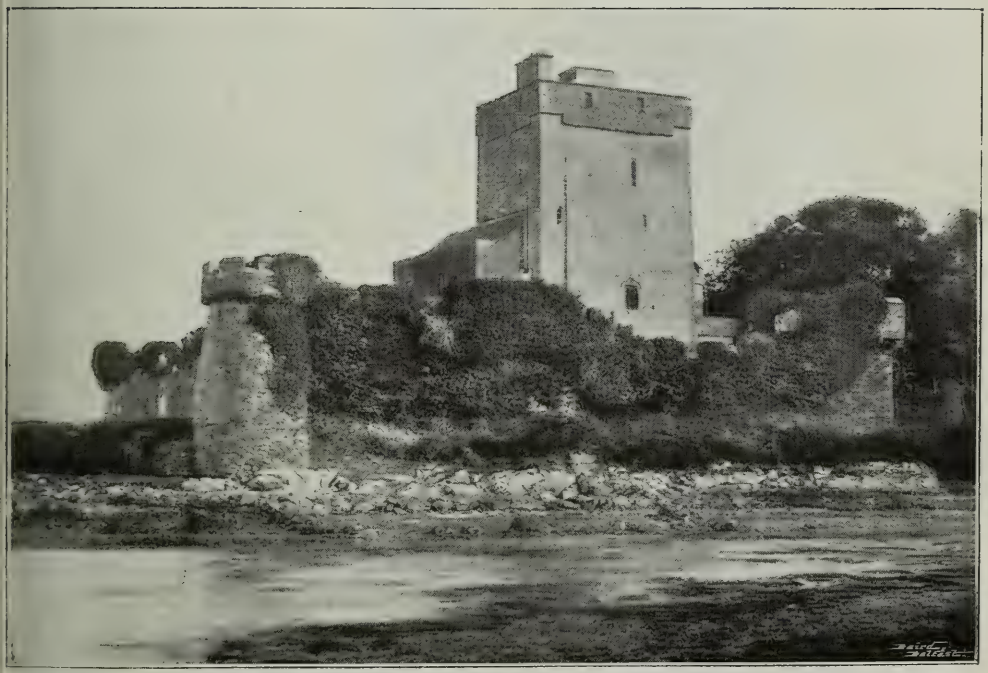
The line passes Inch Island, where so many rare birds have been obtained from time to time, and beautiful views can be had on either hand. After leaving Letterkenny the scenery becomes wilder and grander, the heavy gradient causing the train to move slowly enough to allow ample time for noting the beauty of the mountainous district just opened up by this extension of the railway—the great masses of fallen rocks, grey granite lit up here and there with splashes of red and purple heather, emblematic of the bloodshed which went on for centuries over the country now traversed so peaceably; while the silver bog-cotton twinkled all around, like tiny candles placed to "wake" the mighty dead. Some ravines with smoothed and rounded granite rocks remind one forcibly of parts of the Mournes, and then the illusion vanishes as a curve of the line brings a magnificent viaduct into view, with Muckish in the distance. Kilmacrenan—beloved of the antiquary—was passed, and Creeslough reached about 3-30 p.m. Here brakes were in waiting, and conveyed our members to Doe Castle, while the luggage went on to the hotel by special cart. Outside Creeslough several of the quaint lint-wheels for breaking flax were seen in the fields, some evidently still in use by the peasantry. The drive to the castle is one of surpassing beauty, the views embracing land and sea, rich woods and barren shore, comfortable farms and desolate bogs; while the great mountains of Errigal (2,466 feet) and Muckish (2,197 feet) soar into distant clouds on the west. On a rock which juts into an inlet of Sheephaven, the waters guarding it naturally on three sides, and formerly on the fourth side by means of a moat, stands the famous stronghold of MacSwyne-na-Doe, known as Doe Castle.

The date of its erection and the name of its builder are

unknown, but it was apparently in existence in 1440. It witnessed many a turbulent scene, and, although occupied until recent years and much modernised internally, it is fast crumbling to ruin. The fine sculptured grave slab of MacSwyne was visited in the adjoining graveyard and some photographs of it were taken. A Franciscan Monastery, also erected by MacSwyne, formerly stood here, but now every stone is gone—possibly pressed into the service of modern buildings.

Afternoon tea in its most grateful and refreshing aspect was waiting for us on the lawn facing the approach to Doe Castle, where the water was boiled on a huge fire of "turf." At this point the real work of the Club commenced, and as soon as the open-air repast was partaken of, the members of the various sections of the Club found much to occupy their attention, and they were soon hard at work. Some of the results of their labours and the working of the whole time are given at the end of this report.

At half-past five our procession of twelve well-filled outside cars again resumed its way, and the final stage of the journey commenced. The horses were fresh, properly fed, hardy little animals, well accustomed to run up the hills, and along the road at a brisk pace they went without the additional reminder of the whip, the drivers evincing a ready sense of fun, and a laudable desire to call attention to every point of note, their descriptions at times savouring somewhat of the apocryphal. Slightly over a mile from Doe the beautiful Lackagh River was reached, the seaward view from the quaint old bridge being of matchless beauty, and exposing the whole length of Sheephaven, with the wooded point of Doe Castle in the near left, and the woods of Ards further on, showing a continuous curve, while to the right were the great Campion sands and Tramore, with our hotel out in the sand-hills behind at the base of the carn-topped Ganiamore. On the land side were seen the Glenveagh Mountains, Barnes Mountain, and the mountains of lonely Lough Salt. A short drive through the sand-dunes brought us to the Rosapenna Hotel, built in



Doe Castle, Sheephaven.

[Photo. by R. Welch.


BRITISH MUSEUM
NATURAL HISTORY

Norwegian style by the late Lord Leitrim. Soon we were enjoying the comforts of a well-served dinner, after which the President (Mr. W. J. Fennell, M.R.I.A.I.) welcomed the visitors who had joined us, including Mr. W. F. de V. Kane, D.L., M.R.I.A., the President of the Dublin Naturalists' Field Club; Dr. Chaster, of the Conchological Society of Great Britain; Mr. W. J. Browne, M.A., the Chairman, and Mr. D. C. Campbell, the Treasurer, of the Scientific and Literary Society of Derry.

After dinner most of the members wandered over the sand-dunes, which stretch for acres in front of the hotel, and hide the treasured remains of primitive man as he existed in the stone age, as well as many relics of his more advanced brother of the bronze age. Some bent their steps to the headlands, where, over the more western hills of Donegal, divided from us by the deeply-coloured waters of Sheephaven, the setting sun lit up the picture with its departing train of glories, and thus brought to a close a most delightful day in the annals of the Club.

Sunday morning dawned with all the promise of a perfect summer's day, and the advancing hours carried out its utmost fulfilment. The quaint wooden hotel, with verandahs like a summer-house, or a home of ease and comfort, stands in the centre of a district whose distant circumference is a ring or crown of purple mountains; one range beyond another set in the great varying and contrasting degree of that purple colour which mountains seem to claim as their own. In front of the hotel stretch vast tracts of sand-dunes, but behind it rises a grassy hill from which the view of mountains, wood, and land-locked seas with great golden shores glistening in the sunshine, and a moving canopy of most striking cloud effects blend in a picture that never tires, and to view which the visitors climbed the hill many a time, and finally left it with great regret. Sunday is a *dies non* with the Field Club, and no official arrangements were made, but some of the party visited the remains of Lord Boyne's house and garden, which were buried by the drifting Campion sands of Sheep-

haven, with about sixteen farms, in 1784. Many attended Divine service in the well-designed and well-built churches of Carrigart. After lunch most of the party visited the ruined church of Mevagh, which is, like many another, crumbling out of existence. We often wonder if there will ever exist in the Irish peasantry sufficient veneration for the temples in which their fathers worshipped, to prompt them to give a trowel-full of mortar to preserve in its place even one poor stone. Its yard contains an old rudely-shaped cross and a "lucky-stone," which

> "In earlier age than ours
> Was gifted with the wondrous powers"

of curing all the ills that flesh is heir to. But, as a native remarked, "It's like the holy water—no use unless you believe in it." We strongly suspect that the natives had no belief in us, and removed the stone when they saw us coming. Leaving the church, a detour was made along the coastline of Mulroy Bay to visit the "inscribed rocks," which consist of a small well-elevated ridge of "schists," worn quite smooth, on which rudely-formed designs of concentric circles had been cut by a now forgotten people. These bear a great resemblance to some of the "inscribed stones" at Newgrange. The President of the Dublin Field Club, Mr. Kane, claimed for them an intended use as surveys or maps of the raths or strongholds of the chiefs or kings of the time, marking out the limit of territory reigned over and defended by such forts. This conclusion was suggested to him by some similar stones in Kerry, on which he detected an erasure of one ornament or fort, and evidently by tools such as worked the existing circles, and this obliteration he attributed to the striking off the "map" of a lost possession. How far this theory can be maintained we leave Mr. Kane to work out.

We regret that these primeval ornamentations are fast being worn away by people sliding over them; they will, like the church, soon be lost unless protective measures are adopted.

At seven o'clock we dined in the hotel, after which another visit was paid to the hillside to witness the departing day.

We may mention that the hotel accommodation was taxed to the utmost, and an overflow section had to be housed in the "cottage," about half a mile from the hotel ; but this was not felt as a drawback, for the very attentive manager of the hotel, Mr. J. W. Manning, had a motor car in attendance to bring the few who slept out up to the hotel in the morning, and from it again at ten o'clock each night.

Monday came and went in full summer dress, and with all the gladness of summer-time, tempered with a gentle breeze. After breakfast the photographers, professional and amateur, were hard at work, and the members were photographed in most up-to-date groups in front of the hotel. This recording duty performed, a start was made for Downing's Bay—the herring fishery station of the Congested Districts Board—where we were met by the Instructor, Mr. Duthie, who conducted us over the station, and with great courtesy explained the entire system. This gentleman's explanation was listened to with great attention, and many notes were taken for future reference. Under the fostering care of the Board, the development of this fishery station has had a remarkable success. In dealing with a population which had no previous knowledge of the herring fishery, the Board found it necessary to provide boats on the "share system" instead of issuing a loan to a fisherman to buy a boat, and leaving him responsible for its care and upkeep all the year round. The loan system is suitable when the men are fishermen by trade, and well acquainted with the management and repair of boats and gear ; but the Donegal men are only fishermen for a few months in the year, being farmers for the rest of the time. The Board keep an instructor (generally a skilful Scotch fisherman) on board each boat for a good many seasons, until the men can manage it and fish properly. The instructor sells the fish caught to local merchants and curers, and divides the profits into nine parts, six of which go to the crew in equal shares, and three to the Board. Of these three shares, one is

treated as a payment of cost of instruction, and two as a repayment of boat and gear. Some of the boats are now working without an instructor, and in this case the whole three shares go to repay cost of boat and gear, which become the property of the crew when the cost is paid off.

Some years ago when the fishery was established the Board did the curing of the herrings and sold them ; now the fishery is so successful that there are many merchants on the spot ready to buy and cure. These Downing's Bay herrings are the finest in the world, and fetch the highest price when sold in America and Germany—the two great markets for cured herrings. A photograph taken in 1892 shows only two or three Tory Island curraghs at the pier, selling probably cod and ling. Now the Board have fifty large decked boats, and almost thirty others come from Scotland every year, representing a capital of £30,000 in boats and gear, while many steamers are necessary to carry away the fish.

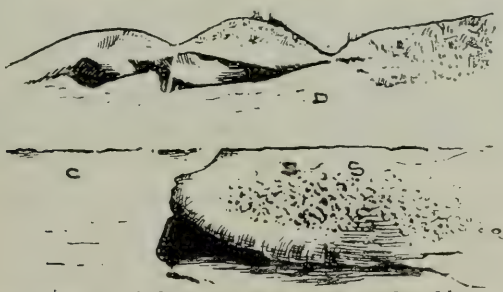
Mr. Duthie has been located here from the initial movement, and has watched the growth with the care born of enthusiasm, and his hope of the future development is unabated. Before departing from the station, a vote of thanks to Mr. Duthie was proposed by the President, seconded by Professor Gregg Wilson, and carried with acclamation. The success attendant on the fisheries may be understood from the fact that "one boat alone in one season earned in cash two-thirds of the entire rent-roll of the peninsula." Another interesting fact mentioned was that the Downing's Bay herrings on some occasions were re-sold in Germany for five pounds per barrel, or about one penny each, and were sold at about equal to one shilling each as luxuries in the cafés.

That the system is taking root in the minds of the native fisher is shown by the fact that an up-to-date boat fully equipped, costing about £300, was recently ordered by a crew paying the cost in cash, all except £20. Nets are steeped in cutch and afterwards treated with bichromate of potash, then dipped in a mixture of coal tar and creosote, and finally wrung out and dried. This is found to be the best preservative treatment.

Mr. Duthie said he was much pleased to give the information, and would report our visit to the Congested Districts Board, who, he was assured, would be pleased to hear of our satisfaction with the way everything was carried out. These things must appear as great results when the previous conditions are studied, and show how a paternal Government can direct and foster the latent energies of a people too long neglected.

We have heard of the young population being driven out of the country and emigrating to America; and here the inspector said that too many when they found themselves possessed of twenty pounds in cash would turn their thoughts westwards, leaving the reality of the golden harvest of their native sea for the visionary hopes born of enchantment lent by distance. However, our friend hoped that continuous success and its attendant comforts would soon produce far different results. It was little wonder that such a deep-rooted interest in the country and its people as this gentleman possesses drew so many expressions of appreciation from the members of the Club, as in the evening they conversed under the verandah of the hotel and compared notes of a visit not easily to be forgotten.

After lunch, cars were taken up the promontory to the lonely Bay of Tranarossan with its kitchen-middens, where



(*s*) Pocket of wind shells, collected on a hardened layer from dunes (*d*) undergoing erosion.

some interesting articles of bronze and bone have been recently found.

Some members picked up a flint arrow-head, a few bone

needles, and several flakes and worked scrapers, which are extremely rare, rocks containing flint being unknown in the district. The road runs among wild scenery, high enough along the slopes of Ganiamore to show the narrow entrance of Mulroy to the north-east, before it drops down through a steep glen to the remarkable sand plain of Tranarossan. Melmore Mountain (544 feet) is of more than ordinary interest, the eastern and western sides being composed of different kinds of rock, the sharp division of the old schists and the lighter-coloured granite being well shown in the accompanying photograph. Here the sand, driven up by the westerly gales, can be seen encroaching on the cultivated slopes, nearly 200 feet above the plain.



Last remnant of a partly consolidated land shell zone.

The cliff scenery at each side of the Rosses strand, carved by the Atlantic breakers, delighted the artists of the party. Sufficient time was allowed for sketching and for a thorough examination of the middens before taking the cars back to the hotel. After dinner a business meeting of the Club was held, and Mrs. Letts, Miss M'Connell, Messrs. W. H. Stephens, Samuel Stephens, and J. St. Clair Boyd, Jr., were elected members. A most cordial and well-deserved vote of thanks to the Secretaries—Mr. Robert Patterson and Mr. Nevin Foster—and to our invaluable guide, Mr. Robert Welch, brought the third day's proceedings to a close, with many regrets that the next morning should see our faces turned once again southwards.



Melmore Mountain and Tranarossan Kitchen-Middens.

[Photo. by R. Welch.

(*s*) Schists. (*g*) Granite. (*m*) Middens. (*p*) Great Sand-plain.
(*x*) Sands encroaching on mountain farms.


BRITISH MUSEUM
NATURAL HISTORY

Our party left the hotel on Tuesday morning at 9-0, forming a procession of twelve outside cars driven by those sturdy, hard-going Donegal horses that never seem to tire. The day was dull and showery, but it failed to damp the spirits of the party, or to rob the country of its views of rich pastures, woodland, mountains, and winding roads. The Earl of Leitrim had kindly invited us to drive through his beautiful demesne of Mulroy, which is charmingly situated on the winding shores of the lough. The programme, in describing the route along the shore of Mulroy Bay to Milford, did not say a word too much about the delightful views opening up at every turn of the road along the narrow winding bay, steep heathery hills on the one side with Mulroy on the other, broken up by its many islands and little wooded points. If the praise in the programme was limited, the reality caused raptures of unbounded delight.

At Cratlagh the road runs through a beautiful wood three miles long, which slopes down to the water's edge, where an hour was spent in collecting and sketching. The thick underbrush, with masses of fern, moss, &c., covering every available space even of the rough wayside, formed a fine collecting ground for botanist and zoologist. The vehicles were waiting at the margin of the wood, and the drive was resumed to the head of the lough, where beautiful vistas of mountain, wood, and water are to be seen as the road winds in and out along the rugged hillsides, this being one of the most picturesque spots in the country.

Arriving at Milford, a halt was called at M'Devitt's Hotel, where lunch was served and a most enjoyable hour spent before resuming the drive to Rathmullan, which was reached at 3 p.m.

Leaving Milford, the road runs along a high table-land, then descends to the sea again at Ray Wood, through which the road lies for miles along the shore of the lovely "Lake of Shadows," until Rathmullan—the ancient capital of Fanait—is reached. The ruins of the Abbey were then visited. It was built in the fifteenth century for the Car-

melite Order, and to the west of it stood the castle of the MacSwyne-na-Fanait. This little harbour has had an eventful history, and is one of the most interesting spots in all Donegal. In 1587 the celebrated kidnapping of Hugh Roe O'Donnell took place here. Treacherously trapped by Captain Birmingham, Hugh Roe was taken to Dublin Castle, from whence he escaped in 1591. The story of his capture, escape, chieftancy, victories, and miserable ending in 1602 has recently been told in vivid language by Standish O'Grady. By way of reprisal for the many raids of Red Hugh, George Bingham, son of the Governor of Connaught, sailed down Lough Swilly and plundered the Abbey of Rathmullan in 1595. But the most dramatic event that took place here was the "Flight of the Earls" in 1607.

A steamer from Rathmullan brought the party to the Derry side of the Lough, and a special train conveyed all to Londonderry, where the home train was taken at 6 p.m. Dinner was served as soon as the train started, after which the members adjourned to a reserved saloon; and after a most enjoyable run Belfast was reached, and the "Long" excursion was a thing of the past, but it will be many a long year before its memories fade away from those who partook of its pleasures and its work. The Club desires to record its deep obligations to the Belfast and Northern Counties Railway and the Letterkenny Railway Company for their courtesy, attention, and willing assistance extended to it.

The district visited proved very rich in fern life, Cratlagh Wood in particular being found most prolific in this section of our flora; here that rare species the Hay-scented Fern (*Lastrea æmula*) was observed growing in profusion along with luxuriant specimens of many of our commoner species, some of which, as the Hard Fern (*Blechnum spicant*), yielded to our collectors fronds of bifid and other varieties, while specimen fronds of the common Bracken (*Pteris aquilina*) proved to measure upwards of six feet in length. In the neighbourhood of our Hotel the Moonwort (*Botrycium lunaria*) was collected, and that local species the Black-stalked Spleen-

wort (*Asplenium adiantum-nigrum*) was found growing on almost every dry stone-dyke and roadside, while in the crevices of the sea cliffs the Sea Spleenwort (*Asplenium marinum*) was observed to be plentifully distributed, and in boggy or marshy spots was seen the Royal Fern (*Osmunda regalis*). The absence of the Hart's-tongue Fern (*Scolopendrium vulgare*) was noted, the explanation given being that this district has not got the limestone rocks for which this species exhibits a decided partiality, as contrasted with the Hard Fern, whose calcifuge nature is so well recognised, and is here found growing in profusion.

The following were also found:—*Sedum rhodiola*, plentiful on the cliffs of Melmore Mountain; *Lithospermum arvense*, *Filago germanica*.

In the absence of woodland and hedgerows it was not to be expected that the Rosguill peninsula would prove rich in land-bird life, but during the four days spent in Donegal fifty-nine species of birds were observed, among which may be mentioned the Wheatear, very common among the sandhills; the Tree Creeper; the Linnets, which have taken possession of the recently-planted fir trees at the side of the Hotel; the Dunlin, observed in full breeding plumage; and the Little Tern, of which a pair was observed on Lough Swilly. Visits were paid to the nesting-places of some of the sea-birds on the cliffs and two large breeding-colonies observed, one of which is occupied by about a hundred pairs of the Common Gull (*Larus canus*), (by no means the most common of the gull family in this country), and a few Shags; while the other is teannted by Rock-pipits, Shags, Oyster-catchers, Rock-doves Common and Herring Gulls, and Black Guillemots. The young of the Shags and Gulls were observed in the ledges of the cliffs, and a curious difference of habit noted between those of the Herring and Common Gulls, for while the former (whose nests were placed in the higher ledges of the cliffs) stood up and looked defiantly at the intruders, the latter crouched down on the rocks, one little bird in particular being observed, ostrich-like, with its head

hidden underneath a projecting ledge; and all the while the parent birds circled round above us uttering their wild and almost deafening cries, which could still be heard for long after we had taken our departure. Along the shores of Sheephaven and Mulroy Bay, Curlews, Herons, Redshanks, Lapwings, Ringed Plovers, and Dunlins were observed in their feeding grounds, while among the Ducks observed on Sheephaven the Sheld-duck and Shoveler were noted. The only bird of prey observed was the Kestrel, which has its breeding-place in the Muslac Cliffs.

Bones of the following mammals have been found in the kitchen-middens: Red Deer (very abundant, some fine antlers being found by the party), Ox, Sheep, Goat, Boar, Dog, Marten, Hare, Rabbit, Horse, Rat, Mouse, Seal, and Badger. A tympanum of a Whale was also picked up. Many of these bones had been split by human agency to extract the marrow.

Bones of the extinct Great Auk have also been found recently on the kitchen-middens, and the party found many valves of the shell *Venus verrucosa*, now seemingly extinct in the North of Ireland, though still plentiful in Bantry Bay.

The great sand-dunes of Tramore are largely composed of very fine broken-up shells, broken sea urchins and their spines which have come in from Sheephaven. With these there are myriads of minute sea-shells unbroken, and many Foraminifera, especially of the genus *Miliolina*, which form conspicuous patches on the many strands of the little peninsula. Mixed with this mass are many species of very small land-shells; in some cases the latter form well-marked bands in the dunes, showing that they are evidently the sections of old hollows, in which the shells were collected by wind action, &c., but now cut through by the erosion of old dunes, which are moving to build others more inland. Here the sieves were used with advantage, quantities of beautiful little Vertigos, among others, being obtained. The rare *Planorbis glaber* was found in Rosapenna Lough, and some small mountain tarns yielded a few of the troublesome genus *Pisidia* for future identification. The rock-pools furnished the sea-hare (*Aplysia*), which

yields such a deep purple dye. One evening after dinner a party, mainly ladies, visited the caves of Muslac, the long cave being lighted with candles, this party noticing the great folds and contortions of the massive beds of quartzite of which the Muslac Cliffs are composed; the fine folds, very close together, of the schistose rocks at the ladies' bathing cove were also examined; and a volcanic sill, a long narrow mass of basalt, either interbedded with the metamorphic rocks or intruded among them at a later period. This latter being fairly typical of many intrusions on Rosguill.

The strands along Mulroy had fine patches of small shells, among which *Rissoa* and *Odostomia* were plentiful, and some members who crossed the Mulroy entrance to "Fanad-between-the-Waves" found little wind-blown pockets of these, with Foraminifera, and many small beetles, plentiful on the dunes of Doaghmore Bay, far away inland from the tide-mark. Later some thick masses of marine shells were examined in the rock-gullies at Muslac; also the habitat of *Otina otis*, a rare shell recently found in shell *debris* on the strand. At Ray Wood some members were fortunate enough to find some very rare or very local species of land-shells, including *Limax cinereo-niger*, about which a keen controversy lately raged, the exquisite little *Helix lamellata*, *Hyalinia excavata*, and white or hyaline colonies of other good or common species; this locality would evidently well repay further investigation.

LARNE HARBOUR.

(Half-day Excursion.)

The fifth excursion of the season took place on Saturday, 1st August, when over fifty members and friends assembled at Larne Harbour on the arrival of the 2-15 train from Belfast. The majority came by that train, but many members were staying at Larne Harbour just then. The chief object of the

excursion was to give the members of the Field Club an opportunity of inspecting the work and working methods of the Ulster Fisheries and Biology Association. Since its foundation last March the Association has accomplished a considerable amount of work, and the Field Club members were glad to see so much enthusiasm and capacity for hard work displayed by the new Association. No feeling of rivalry exists between the old and the new organisations; while the advancement of knowledge is the object of both, they are tilling separate fields, and can be mutually helpful to each other.

When all had assembled at Larne Harbour Station the party was divided into three groups; the first went for a trip up Larne Lough in the Association's steam launch "Mysis," under the care of Mr. W. Rankin, who was in charge of the launch for the day; the second visited the celebrated Larne gravels, under the guidance of the President (Mr. W. J. Fennell, M.R.I.A.I.); while the third went straight to the Biological Station of the Association, where the Hon. Director (Professor Gregg Wilson, D.Sc.) explained the various objects of interest arranged on the shelves in the laboratory, as well as the different nets and apparatus in use. The routine work of the place was explained, and it was mentioned that physical and meteorological observations are regularly made, in addition to those on the structure, habits, and distribution of animals. The various kinds of apparatus made use of were demonstrated; and special interest was shown in the incubator that is used in the process of embedding animals or tissues in paraffin as a preliminary to making fine sections of them with a microtome. A large number of living specimens representing different groups of the animal kingdom were exhibited and described. Among these were several little plaice, which had been collected from the shore within the last few days. They measured from five-eighths of an inch to an inch in length, and must only have recently taken to life at the bottom, after a period of drifting about with the surface currents. It was explained that one aim of the workers at

the Fishery Station is to ascertain the time when such young fishes come inshore, and to follow their subsequent migrations. Six different species of *Tunicata* were also among the living exhibits, and attracted much attention. Three of the species were simple tunicates, while the others showed combination of individuals to form colonies. The neighbourhood of Larne seems rich in such forms, and earlier in the year large numbers of the related genus *Appendicularia* were common in the tow-net. *Appendicularia*, like the larval stages of ordinary tunicates, shows decided affinities with vertebrates, having skeletonic, respiratory, and nervous systems on the same plan as the highest animals at an early stage of development. The worms on view were of several kinds, and some of them displayed their beauties to the best advantage. The so-called "mad-worms" (*Terebella*) were the most striking of all, and it was obviously a surprise to many of the Field Naturalists to learn that such weird creatures were among the commonest dwellers in the mud of Larne Bay. The cat-worms (*Nephthys*) exhibited freely their characteristic habit of shooting out their bag-like proboscis. *Crustacea* of various families were shown, among them large numbers of *Mysis*, the spectre-shrimp, which has given its name to the steam launch of the Fisheries Association. The ears in the tail of this quaint creature were demonstrated under the microscope. *Mysis* is a common marine organism, but one species (*M. relicta*) is specially interesting, because of its occurrence in the fresh waters of Lough Neagh, where it forms an important food of the Pollan. Several molluscs and star-fish were shown, as well as some half-dozen species of local sponges. Attention was also called to the beginning of a museum of Marine Zoology, and the best methods of mounting preparations in spirit and formalin were illustrated. Finally, the numerous specimens already secured by the Fisheries Association, and now stored on the shelves of the general laboratory, were examined. They include a number of species new to the district, and many that are named and available for reference, as well as not a few that are still to be

identified. It was intimated that workers are still wanted to take up several groups of marine animals, and members of the Field Club were invited to co-operate with the present workers of the Fisheries Association in studying the material that is obtainable, and which would be freely placed at their disposal.

About sixteen members went out in each trip of the steam launch, so that all had an opportunity of seeing the entire methods of work carried out by the Association, and the results already obtained. Much satisfaction was expressed at the business-like look of the whole establishment, and the members left, feeling that Professor Wilson had given them a delightful peep into one of nature's most fascinating subjects —marine zoology. At the same time the economic value of the Association's work, when tabulated and fully understood, will be enormous, and the laboratory will be of great use to local fishermen.

At six o'clock all assembled in the Olderfleet Hotel for tea, after which a short business meeting was held. The address to the King as presented by the Club, was on view as a photograph, and also his Majesty's gracious reply. These have since been framed and hung up in the new Club-room in the Belfast Museum. A vote of thanks to Professor Wilson and Mr. Rankin was cordially passed, on the motion of the President, seconded by Mr. William Gray. Mr. F. E. Ward was elected a member, after which Messrs. R. Young and W. Gray exhibited and explained flint implements collected in the locality, and distributed them among the members. A most successful and enjoyable excursion terminated by the majority of the members returning to Belfast by the 7-40 train.

BENBURB.

The sixth excursion of the season took place on Saturday, 22nd August, when twenty-eight members and friends assembled at the Great Northern Station in time for the 8-40 train to Armagh, Benburb being the place selected for the excursion.

Armagh is the old ecclesiastical capital of Ireland, and its traditions date back for three thousand years. History tells us that it has been pillaged nine, and burnt seventeen times. Originally the site of the present city was called *Drum-sailech* (the hill of sallows or sallies), but later it was known as *Ard-macha*, a name said to have been bestowed on it by a queen of Ireland who flourished about 350 years B.C. The Protestant Cathedral (at present undergoing extensive repairs) stands on the site of the original church erected by St. Patrick about the year 450 A.D., and is dedicated to Ireland's patron saint; it is cruciform in shape, and measures about 183 feet in length and 119 feet in width, and is surmounted by a short square battlemented tower 110 feet high. The Roman Catholic Cathedral, also dedicated to St. Patrick, is an imposing edifice in the pointed Gothic or decorated style, measuring 240 feet long and 142 feet wide, with spires 210 feet high rising from towers on each side of the main entrance. The foundation stone was laid in 1840, and the building completed in 1873.

Brakes were waiting at the station, and we were driven quickly through Armagh and out into the open country beyond. About two miles out rain, which had been threatening, came on in a somewhat heavy shower, which fortunately did not last very long, and with this exception the rest of the day was beautifully fine, showing up the country to advantage. The rich crops in the numerous orchards we passed were much admired, while all around tokens of an abundant harvest gave a comfortable and prosperous look to the whole district. The only blots on the fair scene were the too numerous empty tumble-down homesteads, once doubtless the loved possessions of happy families; now only speaking to us of emigration, and consequent loss to this country of life and work. Benburb was reached at twelve o'clock, and here a pleasant surprise awaited us. The owner of the estate—James Bruce, Esq., D.L.,—on learning of the intended visit of the Club, had kindly instructed his courteous agent, Averell Lloyd, Esq., J.P., to receive the party and show us every attention. The

pleasure of the day was largely owing to Mr. Lloyd, who was assisted by Messrs. Mills and Haldane.

On dismounting from the brakes, the members visited the Estate Office, where a most interesting and quaintly illustrated volume dealing with the ancient history of Benburb was on view, and was kindly explained by Mr. Lloyd, who then conducted the party over Mr. Bruce's magnificent mansion, a privilege which was much enjoyed. Opposite one of the entrance gates a fine old sundial, surmounting what was once a sentry-box, was examined and photographed. The view from the roof of the Manor House is particularly fine, the towers of Armagh in the middle distance being backed by our familiar and majestic Mournes on the horizon, while on another side can be seen Sessiamagarroll Fort, with the crannoge of Curran Lough close by. Leaving the house, the exquisitely-kept grounds were visited (proving a veritable paradise to the botanists) and the greenhouses. In one of these is a beautiful fern grotto, formed of tuffa or Lancashire spar, with water dropping down, and the ferns most luxuriant; among them *Asplenium bulbiferum* and *Cyrtomium falcatum* being very fine. It was delightful to see everything so well cared for and in such good condition. A visit was then paid to the celebrated Castle of Benburb, on the River Blackwater, which flows through the grounds. It occupies a remarkably strong position on the summit of a limestone cliff, rising perpendicularly from the river to a height of 120 feet, the date of its erection being uncertain. Here in 1597 the English were defeated by O'Donnell of Tyrconnell. In 1619 one thousand acres were granted by James I. to Sir Robert Wingfield. Previous to this he had built a castle and the present church, and had founded the village. In 1641 the castle was surprised by Sir Phelim O'Neill and all the inmates put to death. The battle of Benburb was fought 5th July, 1646, when Owen Roe O'Neill and the Irish army defeated General Munroe, inflicting disaster on him and his men, and capturing their artillery and baggage. The castle was soon after dismantled and has ever since remained in ruins. These

ruins have been carefully preserved by Mr. Bruce, and their ivy-mantled walls were inspected with much interest. It was certainly a position of immense natural strength.

Lunch was partaken of within the castle, and then various collections were made in all departments of botany and zoology. But the geologists of the party were particularly happy, as the limestone quarries of Benburb are celebrated for the wealth of fossils they contain, and hammer and chisel were soon at work. Among the fossils collected were *Productus giganteus*, *Productus semireticulata*, *Fenestrella antiqua*, *Lithostrotion basaltiformis*, *Lithostrotion junceum*, *Cyathophyllum fungites*, with stems of Encrinites, which are most abundant in the carboniferous limestone of this district. Good collections of fresh-water shells and isopods, cave spiders, &c., were made, and the prizes brought home for examination. The ornithologists noted twenty-two species of birds during the day. The President having photographed the party at the old castle, and also at the sundial, the brakes were again mounted, and the return journey was begun, with much regret that time would not permit a closer acquaintance with the many beauties and attractions of Benburb. The road taken was a different one from the morning route, and led us through the decaying village of Blackwatertown, on the north bank of the river, and by prosperous farms, with well-stocked orchards. Armagh was reached about four o'clock. Here most of the party visited the Roman Catholic Cathedral, where, by the kindness of the Rev. Michael Quinn, Adm., everything of interest was shown to us. The interior of the building is now in the hands of Italian decorators, who are engaged in covering the whole of the inside walls with beautiful and costly mosaic, and erecting carved screens of the purest white marble. About £34,000 is being spent upon the inside decorations, so that when completed this Cathedral will be one of the most beautiful in Ireland.

We were also shown the magnificent robes worn by the Archbishop and Bishops at the different services, the beautiful hand-worked embroidery being examined with interest

by the lady members present. Afterwards the exterior of the Protestant Cathedral was inspected, and at 5-15 all had assembled in the Charlemont Arms Hotel, where an excellent meat tea was much enjoyed. At its conclusion a short business meeting was held—the President (Mr. W. J. Fennell, M.R.I.A.I.) in the chair—when a hearty vote of thanks to Mr. Lloyd was moved and carried unanimously. The election of Mrs. John M'Robert, Dr. W. Clarke Robinson, and Mr. James Williamson to membership terminated the meeting, and there was just time for a few of the more energetic members to pay a hurried visit to St. Patrick's holy well, on the hill of the same name. The usual collection of rags in various stages of decay was found on the tree by the well. The 6-34 train brought all back to Belfast.

WOODBURN GLENS.

(Half-day Excursion.)

The seventh excursion of the summer session took place on Saturday, 5th September, to Woodburn Glens, when sixty members and friends attended. The weather in the early morning had been so wet and unsettled that this large turn-out of members was particularly gratifying to the officials of the Club, and proved how popular the excursions have been. Those who went were rewarded by an exceptionally warm and bright day, the rain only falling in a short shower while the party were indoors at tea; the good luck which attended every excursion but one this season remaining to the last. The original intention had been to go by rail to Carrickfergus and drive to the Glens, but unforeseen circumstances rendered this impossible, and the party drove down and back the whole way in well-horsed brakes kindly provided at very short notice by Messrs. Turner. The change in the programme was much enjoyed and appreciated by the members. In what seemed a short time the large party arrived in the vicinity of Duncrue Fort, where they were met and welcomed by Mr.

George E. Reilly, who, with his sons, kindly acted as guides for the afternoon. Leaving the brakes, a short walk up a lane brought us to the ruins of Killyaun Church, with the fort of Duncrue on the other side of the lane. Here Mr. Hamilton, the owner of the ground had most thoughtfully cut steps in the bank and removed part of a hedge in order to facilitate access to the ruins, an attention that was much appreciated by the ladies present. Little now remains of the old church save a small portion of the west wall, but the outlines of the other walls can be seen under their grassy covering, and perhaps future archæologists will be enterprising enough to uncover and examine what remains. Mr. Reilly gave a short account of all that is known of the church and fort, and Mr. Hamilton exhibited various objects of antiquarian interest which he had found in the vicinity, giving a well-cut arrow-head to our President as a memento of the occasion. Having admired the fine view of Co. Down from the Copeland Islands to the Mourne Mountains, the party moved on to the old fort of Duncrue, where Mr. Reilly described the position and uses of the "bawn," which still exists beside the earthen mound. The curiosity of the members being satisfied, the walk to North Woodburn Glen was begun, and, after a scramble down muddy, slippery banks, the river-level was reached. Here the party divided in two, the geologists walking up the river to various outcrops of interest, while the rest slowly made their way up the opposite side of the glen, and so on by country roads to the Water Commissioners' "hall.", On the way it was most interesting to see a genial F.R.S. up to his shoulders in a thorn hedge while he laboured at the roots of an obstinate fern which refused to come out easily. The success which attended his efforts was greeted with cheers as he emerged, bleeding but triumphant, bearing the prize, which proved to be an abnormally large specimen of *Polystichum aculeatum*, a rather local species. The whole party met at 5-30 in the "hall," where a welcome tea was enjoyed, while the weather took that opportunity to indulge in a heavy shower, which ceased as soon as the members were ready to go outside

for the "field meeting," at which the President (Mr. W. J. Fennell, M.R.I.A.I.) presided. A hearty vote of thanks to Messrs. Reilly and Hamilton having been passed, three new members—Mrs. John Y. Calwell, Messrs. John Y. Calwell and Thomas Frizelle—were elected. The descent to the South Woodburn Glen brought the party past the large reservoirs and along the well-kept paths and steps of the Water Commissioners down into the Glen. By this time it was too dark to see the beauties of the Glen properly, but to many it was a revelation of loveliness, and the intention to revisit such a charming spot was frequently expressed. The path winds along the river, which is crossed by many rustic bridges, and the fern-covered rocks looked likely to be the home of many and various animals and plants. The brakes were waiting at Mr. Reilly's house, and, after bidding farewell to our courteous guides, the drive home was begun, the bright moonlight and soft night air combining to make the drive a delight to the members. Belfast was safely reached at 9.15, and the excursions for 1903 became events of the past. Owing to the swollen state of the river the geologists found it impossible to reach the sections they desired, so this naturally interfered with the success of their work. But collections in other departments were made, the best shell found, *Helix arbustorum*, being only recorded from this locality in the North of Ireland. A good plant of a depauperate variety of the Lady Fern (*Athyrium filix-fœmina*) was obtained, as well as many specimens of the commoner species, and the ornithologists of the party had a list of 22 species of birds observed during the afternoon.





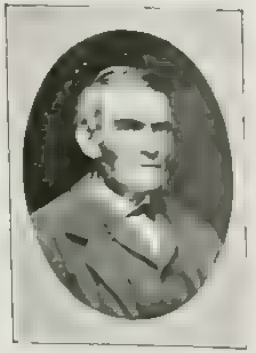
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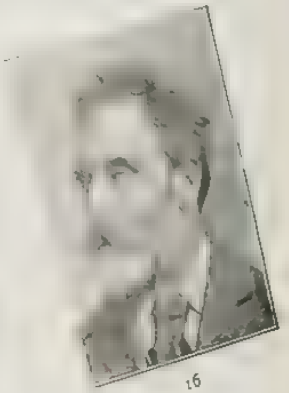
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SOME CLUB BUILDERS.

1. Ralph Tate, F.G.S., F.L.S. Hon. Sec., 1863-4. Practically the founder.
2. Joseph Wright, F.G.S. Committee, 1869-1905; Treasurer, 1880-87; Vice-President, 1887-89.
3. Wm. H. Phillips. Treasurer, 1864-70 & 1891-1905; Committee, 1870-73; Vice-President, 1901-2.
4. S. A. Stewart, A.L.S. Committee, 1863-1903; Treasurer, 1887-1891. One of the original five organisers.
5. Hugh Robinson, M.R.I.A. Committee, 1863-89; Hon. Sec., 1869-84; Vice-President, 1885-87; President, 1887-89. One of the five who met in Lonsdale Street to found the Club.
6. Wm. Swanston, F.G.S. Committee, 1869-1900; Hon. Sec., 1875-90; Librarian, 1890-1900; Vice-President, 1891-93; President, 1893-95.
7. F. W. Lockwood. Hon. Sec., 1880-91; Vice-President, 1893-94; President, 1894-95.
8. John Anderson, J.P., F.G.S. Committee, 1867-76; Vice-President, 1869-73; President, 1873-74.
9. Prof. James Thomson, F.R.S., LL.D. Chairman of Committee, 1866-69; President, 1869-73.
10. Rev. R. Workman. Member, 1864-1905.
11. J. S. Holden, M.D., F.G.S. Committee, 1863-5.
12. Wm. MacMillan, J.P. Committee, 1863-70. One of the five who started the Club.
13. Canon Grainger, D.D., M.R.I.A. Chairman of Committee; Vice-President, 1883-85; President, 1863-4; 1885-87.
14. R. Lloyd Praeger, B.E., B.A., M.R.I.A. Hon. Sec., 1890-93.
15. Wm. Gray, M.R.I.A. Committee, 1864 to 1903; Hon. Sec., 1866-75 & 1899-1901; Vice-President, 1875-78; President, 1879-81 & 1889-91.
16. W. H. Patterson, M.R.I.A. Hon. Sec., 1864-65; Committee, 1866-79; Vice-President, 1882-83; President, 1883-85.

Winter Session.

Note.—The authors of the various Papers, of which abstracts are here appended, are alone responsible for the views expressed in them.

ANNUAL CONVERSAZIONE.

The Winter Session was inaugurated on 28th October by a Conversazione in the Exhibition Hall. It was one of the largest held in recent years in connection with the Club, over four hundred members and friends being present. Tea was served from 7 to 8 o'clock, the tables being presided over by several lady members of the Club, after which those present had ample opportunity for examining the following interesting exhibits in the Hall.

Botany.—Mr. N. Carrothers, collection of mounted ferns and flowering plants; Mr. George Donaldson, North American ferns; Mr. Nevin H. Foster, varieties of the lady fern (*Athyrium filix-fœmina*); Mr. P. F. Gulbransen, a new method of mounting plants; Mr. W. H. Phillips, variations of British ferns; Mr. R. Ll. Præger, M.R.I.A., rare plants from the Ards, including *Glyceria festucæformis*, new to the British flora; rare plants from Clare Island, Co. Mayo; Rev. C. H. Waddell, B.D., flowering plants from the Isle of Man; rare mosses of Co. Down.

Zoology.—Mr. F. J. Bigger, M.R.I.A., land-shell pocket material from the Horn Head sand-dunes, containing many vertigos; Mr. John Cottney, birds' eggs; nest of long-tailed tit; Rev. G. Foster, a collection of Irish butterflies and moths; butterflies and moths collected in Brittany last July; Mr. W. H. Gallway, living green lizard, etc.; Mr. W. A. Green, mounted birds, etc.; Rev. W. F. Johnson, F.E.S., rare Irish beetles; Mr. D. E. Lowry, a large pike, mounted; Mr. H. Lamont Orr, nest of bullfinch; Mr. James Orr, sea urchins

from Bundoran; Mr. Robert Patterson, M.R.I.A., nests of goldfinch and rook; Mr. George E. Reilly, nest of magpie; Mr. R. Welch, living land-snails (*Helix aspersa*) now over eight years old; Prof. Gregg Wilson, D.Sc., M.R.I.A., specimens illustrating adaptation to environment; Mr. W. H. Workman, M.B.O.U., Algerian bird-skins.

Geology.—Miss M. K. Andrews, microscopic sections of rocks near the junction of granite and silurian, Glen River, Newcastle, Co. Down; Mr. Robert Bell, liassic *cephalopoda* from Waterloo, Larne; the new Irish mineral "Dopplerite," from the peat of Sluggan Bog; Mr. F. C. Forth, A.R.C.Sc.I., geological specimens and models of crystals; Mr. George C. Gough, A.R.C.Sc., sections of fossil plants, crystals and rocks; shells of gastropods cut to show interior; fossils (fish, crabs, etc.), and minerals used as ornaments, and precious stones; Mr. R. Welch, the land-shell deposits and shell-sands of Rosapenna and Tranarossan dunes, Rosguill peninsula, North Donegal.

Miscellaneous.—Miss Andrews, very fine flax thread spun at Comber at the end of the 18th century; Messrs. W. & G. Baird, Ltd., photo-process blocks in all stages of manufacture; Mr. F. J. Bigger, M.R.I.A., Irish straw crosses; photographs of Donegal peasant life; Mr. C. M. Cunningham, L.D.S., exhibit of electro-typing and plating with home-made appliances; Mr. Robert Day, M.R.I.A., "table-book" with illuminated title, enclosing an autograph letter from Charlotte, Duchess of Richmond to Earl O'Neill, July 12, 1856; Oliver Cromwell's belt pistol, with letter of authentication; ancient Irish spirally twisted silver torc with loop and knot attachment, and a plain massive silver penannular bangle found with it, from Beaufort, Co. Kerry; cable pattern silver torc of three twisted strands, with hook and eye fastener, Co. Westmeath; brass oblong Dutch tobacco box engraved with portraits of the Prince and Princess of Orange on the covers; another with battle scenes and portrait of Frederick the Great. Mrs. W. J. Fennell, model of the High Cross of Monasterboice; model of the O'Kelly seal found in

Kilconnell Abbey; Mr. W. J. Fennell, M.R.I.A.I., facsimiles of the famous Limavady gold ornaments, kindly lent by Edmond Johnson, jeweller, Dublin; Mr. F. C. Forth, A.R.C.Sc.I., sketches showing natural flowers and foliage applied to art decorative work; Mr. William Gray, M.R.I.A., photographs taken on the summer excursions; Mr. Robert May, a bronze lamp found in a peat bog near Ballymoney; Mr. W. F. M'Kinney, an Irish quern; gum from New Zealand; Mrs. Riddel, Irish-made toys from Ballycastle Toy Industry, Irish models, cottage furniture, farming utensils, carts, etc.; Mr. Adam Speers, B.Sc., miscellaneous; Mr. J. Vinycomb, M.R.I.A., set of 18 heraldic shields, cases of heraldic seals, bookplates, 19 photographs of addresses presented to their Majesties in Belfast; Mr. R. Welch, photographs of the Sheephaven and Mulroy districts, North Donegal.

During the evening the President (Mr. W. J. Fennell, M.R.I.A.I.) delivered an address, in the course of which he said, as that Conversazione inaugurated the forty-first winter session, he could hardly allow it to pass by without a few words. His first duty was, on behalf of the members, to welcome the visitors, both the distinguished ones and all the others, whom they hoped would soon become distinguished, and he trusted that the exhibition of some of their annual results would soon cause them to become enthusiastic field naturalists and keen workers in one or more of their many sections. He had to congratulate the Club on the great success that had attended its summer session, which success was altogether owing to the untiring exertions of the Secretaries, Mr. Robert Patterson and Mr. Nevin Foster, whose efforts would be long remembered. The excursions numbered seven, with an average attendance of fifty. He thought he might also congratulate the Club on its work in the past session, for the vigilance of its members had contributed to the preservation of various old landmarks. Their advice relative to Greyabbey received courteous and immediate attention from General Montgomery. Some Anglo-Norman memorials had been preserved, and the

attention of the Board of Works had been called to various ruins which should be preserved as national monuments; but it was an almost Herculean task to move this invaluable Board, which they sometimes considered was not acting up to the spirit of the Acts of Parliament which gave it power. It was a matter of considerable gratification to know that the active measures of some of the members contributed to the restoration to Ireland of her "treasure trove," in the now famous Limavady gold ornaments. They trusted that in the future those who sought and found treasures within their shores, no matter what they might be, would be sufficiently patriotic to procure them for their own National Museum instead of bartering them out of the country. They also felt some pride in recording that one of their most able and active members, Mr. Robert Bell, had been the first to make the interesting discovery that the substance known as dopplerite existed in Ireland, the only other places in which it is found being Germany and Switzerland. Mr. Bell's discovery had awakened much interest in geological circles, and the reputation of their section might be well assured while they possessed men like him. During the year the newly-organised sister society—the Ulster Fisheries and Biology Association—had commenced to work with great earnestness, and had been well supported by some of their members. They regarded the rivalry, if such it may be called, as a fine healthy one, spurring them on to additional energy. He would like to remind them that the Club was now taking another step in advance, and that they had secured the use of a room in the Museum, College Square. That room would be open every Wednesday evening from seven till nine o'clock, commencing next Wednesday, and they asked all who desired to aid the Club to meet there and exhibit any object of interest, and to explain it or have it explained. The winter session would also provide an attractive series of lectures, to which the friends of members were invited and welcomed.

A number of members having arranged to make a presentation to Mr. William Gray, M.R.I.A., on his retirement from

the Committee, one of the Secretaries read the following address, and a purse of sovereigns was presented by Mrs. Fennell.

To WILLIAM GRAY, ESQ., C.E., M.R.I.A.

Dear Mr. Gray,

A large number of your friends in the Field Club feel that they cannot allow you to retire from the Committee without expressing their admiration and gratitude for the unwearied exertions which you have at all times put forward for the benefit of the Club. For forty years you have served the Club in many capacities, faithfully and well—as President, Secretary, Committee-man, Field Lecturer, and Delegate to the British Association. To all of these offices you brought unlimited zeal, a cheerful disposition, and a large amount of information, which you were always ready to impart in the happiest manner to even the youngest member. The advancement of the Club was ever in your heart, and its present satisfactory condition is, no doubt, in a large measure due to your labours in the past. We therefore beg your acceptance of this Address and accompanying Purse of Sovereigns, not for their small intrinsic value, but as visible testimony to the large amount of esteem and good-will which you have so thoroughly earned.

We trust that for many years to come you will continue to attend our field excursions and indoor meetings, where your mature advice and help will always be heartily welcomed.

Signed on behalf of the Subscribers:

W. J. Fennell, *President.*

Robert Patterson, } *Honorary*
Nevin H. Foster, } *Secretaries.*

Belfast, 28th October, 1903.

Mr. Gray read the following reply:—

Mr. President, Mrs. Fennell, and fellow members—The very great kindness you have manifested towards me, has recalled the feelings of thankfulness, pride and embarrassment

with which I stood up to respond to the sentiment, "The health of the bride," on my wedding day. I am sincerely thankful for your extreme kindness in presenting me with such a beautiful and too flattering address, for its generous accompaniment, and for the graceful manner of its presentation at the hands of Mrs. Fennell. Mr. President, it is a matter of just pride to think that after an official connection with our Club for forty years, my colleagues and fellow-members should for the third time testify their appreciation of my services; services rendered as a labour of love, and as such were their own reward. It is a matter of just pride to look back and remember the many earnest and distinguished Naturalists with whom I have been associated; with such as they and such as many of you I have explored the romantic Glens and the unique Coast Scenery of the County Antrim, ascended the slopes of the Mourne Mountains, investigated the historical associations and antiquarian remains of Armagh, traced the folk-lore of Derry and Donegal, roamed through the beautiful scenery of Fermanagh Lakes, and the wild grandeur of Connemara, Galway, and North Clare. Time would fail me in the effort to faintly picture the memories your kindness has evoked. I can only again thank you for your beautiful, valuable, and most acceptable presentation, which I do with the earnest hope that each of you may be afforded opportunities, similar to those that I have had, to study the attractive features of our native land—that you may have the same pleasure that I have had in that study—and that you may be spared in health and vigour to attain the prolonged experience that I have been favoured with, and that when you desire to withdraw from the more severe physical exertions evoked in the prosecution of your nature studies, you too, each one of you, may find yourself the centre of an approving circle of your fellows manifesting towards you that kindness, generosity and uplifting sympathy I am now called to acknowledge, and which I do with sincere thankfulness and manly pride.

(Signed), William Gray.

The lantern display was then proceeded with, and a number of views, taken during the summer excursions by Messrs. Fennell and Welch, were exhibited; afterwards a series of cinematograph films, showing the movements of Rotifers, Mites, Hydra, &c., were shown by Mr. J. Lizars.

The election of the following seven members, Miss J. Moore, Miss M'Gaw, Revd. Charles Pooler, Messrs. Arthur Stelfox, J. T. Abraham, Stephen R. Smith, and James M'Fall, brought the proceedings to a close.

THE CLUB'S BUILDERS.

The first business meeting of the winter session was held in the Belfast Museum on 17th November, when the President (Mr. W. J. Fennell, M.R.I.A.I.), gave an address on "The Club's Builders." There was a large attendance of members and friends.

Mr. Fennell said—It is the prerogative of a President to make an inaugural address no matter what he is President of, and I believe it does not matter one iota what that address is about. That is another prerogative of this exalted position; and I consider I might go a step further and claim exemption, and thus do you all a good turn by relieving you of a most "distressful" hour, but at my elbow was a most determined Secretary, aided and abetted by another irresistible power of a great Home Ruler, so that I am compelled to fall into line with the traditions of the Club and not allow a Session to pass without an inaugural address.

Being thus driven into a corner I looked about in the recesses of a tangled mind for a subject. My own special section, the archæological, seemed to yield no subject that had not been brought before you by more able men; and I felt that to weary you by repetition or even dressing up an old subject in new garments was not exactly what you had a right to expect.

I considered that as our efforts are—or, at least, should be—mainly directed to looking earnestly forward and advancing, and that as the vital energy of the Club is based on that sound principle, and as it has weathered us through many storms safely for forty years, we may with confidence rely upon it as our guiding star for forty more.

The present position of the Club is one of much power for good, and it has made itself felt in many great movements and could, if it be desired, boast of great accomplishments; and its position and standing are so well established that its representations on matters of importance and moment are not to be lightly considered or thrown aside. This is a position that we may justly regard with pride, but let us not forget that, like all things of a similar nature, and especially in matters scientific, the position is not one of sudden growth, the hasty work of a night, like Aladdin's Fairy Palace, but the result of the labour of earnest men through many years, through many adverse circumstances, through great difficulties and often in the face of determined opposition; but the Club's Builders were men of great ability, strong in the conviction that their ends and aims had the light of the lamp of truth to guide them, and such men are not easily put down. I have met such men and I know the self-confident smile that comes over their features when they suddenly meet the Hill Difficulty. They will not let it turn them aside, and if they cannot get over it they will tunnel through it, for get to the other side they will, and do.

It occurred to me that we should not forget men like these, that the retrospective glance, the looking back, has its duties as well as the looking forward, and that in looking back we feel a happy satisfaction regarding the past.

An hour to-night may be well spent in recalling the efforts of the Club's Builders, commencing at the initial movement and the laying of the foundations forty years ago.

No one likes to be forgotten, and I dare say these men of forty years ago hoped to be remembered even as we may

modestly hope that we and our works may be regarded as worthy of a passing thought in forty years to come.

For this purpose I have spent many a pleasant hour going through the minute books of the Club, which record so much and mention so many names; and the fascination is not lessened when I consider how well known they are, and how long remembered many of them will be. Some have passed away to the dream-like regions of the Hereafter, some still remain with us, veterans in years and labours, and how solid and permanent are the works that remain behind. And the life is not misspent that leaves a valued work, even if only a small one, behind it. All names are not written on the high places of the earth where the world at large can see them; but great workers are ever remembered with pride and affection by great workers, and this is often their sole reward. We often hear the pioneer scoffed at, but we estimate such scoffing as the product of a little mind, paying unconscious homage to a greater.

I do not desire to record a long series of scientific investigations, but to tell in a simple conversational manner the story of the Club from its cradle to its manhood—to recall the names of some of those whose labours built up the Club and created its sphere of influence, and to condense the history of its forty years into the limits of one poor hour.

On the 6th March, 1863, some gentlemen met together to found a Natural History Association, and it was resolved:—

1. That it be called "The Field Naturalists' Club."

2. That the objects of the Society be the practical study of Natural Science and Archæology.

and then follow guiding rules much the same as those we have now.

That night saw the following names on the first Committee:—

John Browne, W. Campbell, John Forrester, John Grainger, M.A., John S. Holden, W. M'Millan, W. H. Patterson, S. A. Stewart, Samuel Symington, Robert

Workman, Thomas Workman, with F. Herdman as Treasurer, and Ralph Tate and W. T. Chew as Secretaries.

At the first meeting of the Committee, on the 13th March, John Grainger (afterwards the well-known Canon Grainger) was elected Chairman, thus heading the long list of Presidents.

On the 6th April, 1863, the first excursion of the Club was held, and 88 members left for Ballycarry, and crossed over to Islandmagee and on to Barney's Point, to the Lower Lias, some even reaching the Gobbins. The day was wet, and the minutes state that "heavy rains somewhat damped the ardour of the naturalists," but it did not destroy if it damped, for even now "Field Club weather" is wisely regarded as almost continuous sunshine. The minutes also record for this excursion large botanical and geological collections by the members. Barney's Point has been a favourite hunting-ground ever since, a magnificent nautilus being found there this season—and shown at our last Conversazione by Mr. Robert Bell.

On the 21st April Sections were formed for the better study of Zoology, Geology, Botany, and Archæology, and they seem to have set to work very quickly, their Committees meeting constantly between the excursions.

The second excursion, on the 16th May, was to Randalstown and Shane's Castle and was attended by 50 members and their friends, the route taken being through the demesne of the Rev. C. O'Neill, along the banks of the Main Water River to Lough Neagh, and thence to Shane's Castle. The Round Tower at Antrim was afterwards visited, and the party returned to Belfast by the 5-40 train. A long account of the work done is entered in the minutes, and the inspection of an ancient canoe recently found near Toome.

The prize list for the first year offered special inducements for research in the Botanical, Zoological, and Archæological Sections.

The third excursion was held on the 30th May and was a notable one, the locality selected being Comber and Castle Espie.

The account of this excursion fills nine closely-written pages. At Castle Espie a proposal was made to visit Mahee Island, and it is recorded that the threatening rain induced the ladies of the party, and such of the gentlemen as were afraid of the prospects of a wet walk, to return, leaving only a few more adventurous spirits to proceed, and after various adventures they all met together at Comber and had tea at Jeffrey's Hotel, "where, with appetites sharpened by their walk, they enjoyed with much gusto the tea, at which the matrons of the party presided." The account of this excursion and much of what was seen is almost identical with our excursion to Mahee Island in this present session.

A special archæological excursion was arranged on the 13th June to the Giant's Ring, the party, to the number of one hundred, leaving the Museum in omnibuses, the route being by the old Lisburn Road, and Shaw's Bridge to Drumbo Round Tower. One of the omnibuses broke down, and some of the party had to walk the greater part of the way.

Mr. Wm. Gray, who is with us yet, is recorded as taking accurate measurements of Farrel's Fort and the Round Tower. At the Giant's Ring an address was delivered by Mr. W. J. Forrester on the study of archæology, so that it will be noted that this Section, which has always been a fairly strong one, got to work early in the life of the Club. The Botanists also record a good day's work on this excursion.

I find that in June of this year a dredging excursion was attempted, but it was not carried out, as a sufficient number did not support it. There appear to have been clouds of difficulty round these dredging excursions, but persistent determination finally commanded success.

The fourth excursion—on 4th July—was to Carrickfergus and Lough Mourne by the Woodburn River, and that excursion was partly repeated in the same year, and has been a favourite one ever since, so much so, that we repeated it again during the present year. On the return journey the minutes say that the plant which attracted attention by its beauty and luxuriance was the Wood Vetch (*Vicia sylvatica*).

and that the train for some reason stopped opposite a large bed of it, and a few enthusiastic members availed themselves of the opportunity to procure specimens.

The fifth excursion was to Magilligan on the 15th August. The day's work seems to have been chiefly geological, but the note at the end is worth attention: "We hope to find apology for the non-attendance of our less enthusiastic members, and the ladies in particular." I think we have improved since then, perhaps on occasion we might reverse that apology.

The next excursion was on the 29th August to Whitehead, the Gobbins and Blackhead, in which thirty-seven members took part, and Mr. Tate conducted, lecturing on the geological formations of the district.

I may say that in going through the minutes I find the Gobbins has been one of the favourite places for half-day excursions, even down to last year, and I should like while on the Gobbins to note that on one occasion when investigating its natural features, one of our members was so keen to explore that he undressed and swam round the rocks, and inspected the long line of caves; but that was not in the year we are at present speaking of.

We are now in October, and the Committee on the 12th of that month proposed that the Winter Session be opened with a report on the past work of the society, so that in looking back I am following the line then adopted.

It was also proposed that the "character of a Conversazione" be given to the meeting by having tea and coffee provided, but this proposal was not carried.

The first Winter Meeting was held on November 5th, Mr. Grainger in the chair, when Mr. Chew read the first paper to the Club on "The Aims and Progress of the Society." The Chairman announced that the following papers would be read on the 19th November:—"Geographical distribution of the plants around Belfast," by Mr. Tate. There is no doubt that Mr. Tate was the father, the prime mover, the architect —so to speak—of the Club, and he seems to have been a thoroughly active, many-sided man, one of those real

enthusiasts who never get tired of hard work, and who love to gather hard workers round them. Also a paper on "Notices of rare plants that are easily overlooked," by our valued old friend, Mr. Samuel Alexander Stewart, who thus early came to the front with his great botanical knowledge, a knowledge which every member of the Club still hopes may be long at their disposal.

On November 19th Mr. W. H. Phillips exhibited two specimens of the Common Toad (*Bufo vulgaris*), the first recorded exhibit, in the Club rooms.

On this evening an important resolution was passed, and I believe it was never repealed and therefore probably remains in full force, namely, "That papers read be the property of the Society," the evident intention being to give the Club a right to publish rather than to deprive the author of any claim to his copyright.

The following papers were read during this winter:—"British Forest Trees," by R. Workman, B.A.; "Connecting links between plants and animals," by J. S. Holden; "An account of Lough Neagh, historical and physical, with an account of its fishes," by W. H. Patterson; "Lignites of Co. Antrim and their relation to true coal," by Wm. Gray—his first paper to the Club—which he illustrated with a large number of specimens; "The correlation of the Liassic strata of Belfast with those of England," by Ralph Tate; "Nineveh and its remains," by Thomas H. Browne.

On April 8th the Committee decided to have a Conversazione on the 21st inst., in the Museum, that the admission be 1s. 6d., and that it be a dress conversazione; also that Mr. Robert Patterson, F.R.S., be requested to act as Chairman. We regard with no little pride the entrance of this famous naturalist amongst the ranks of the Belfast Naturalists' Field Club, the more so as his mantle has fallen on his gifted sons, one of whom we have already mentioned (Mr. W. H. Patterson), in connection with the early building up of the Club, and on his grandson, our present Secretary, Mr. Robert Patterson, whose efforts for the Club in these, its later, years have been

no less successful than those of his relations in the earlier ones.

At this meeting—the first Annual Meeting of the Club—the active Mr. Tate resigned his post as Secretary, much to the regret of all who had the interests of the Club at heart.

Mr. W. H. Patterson was elected Secretary and Mr. W. H. Phillips Treasurer (and he is our Treasurer yet), and Mr. Gray was added to the Committee.

I regret to say that the minutes give no account of the Conversazione; and this ends the first year, which owing to its importance I have given in some detail, and I think it compares well with many of its followers. I always think there is a halo round the beginning of things that are honestly good, and in this case deservedly so.

Glancing over the following years I find that in 1864 Greyabbey was visited, and a note is made of slate quarries near that place, then recently worked and abandoned. It is a pity that they are not opened up, considering the present price and the difficulty of getting slates. I find, however, that when I go to the minutes of June, 1877, the Club repeated this excursion, when it found this quarry in working order, and the report says that in addition to roofing slates, much of the material was cut into slabs suitable for hearths and tombstones, etc., its fine, close texture and uniform colour making it specially suitable for these purposes. I fear this industry is once again extinct.

In the Session of 1865-6 the Annual Meeting was held on the 29th May, and the name of the "Field Naturalists' Club," as selected in the first year, was altered to "The Belfast Naturalists' Field Club," by which it has been called ever since, and which is now widely and deservedly known.

In this year our friend Mr. Gray was elected one of the Honorary Secretaries, and under his helping hand the Club grew and prospered. The Club now worked well, both in the field in summer and in the house in winter, slowly and gradually increasing its membership and making its usefulness felt outside its own circle. In the Session of 1869-70 an impor-

tant amalgamation was made, and the Natural History Society and the Field Club held their meetings in common, these meetings being called by a joint circular. For some time this arrangement worked smoothly, but it gradually became evident that there was an under-current of dissatisfaction, and in 1871-2 the separate relations were again resumed, and perhaps wisely. Since then both societies have worked harmoniously side by side, and there is still plenty of work for each to do.

During this year (1869-70) a lecture was given that is well worth recording, namely, "On the Continuity of the Liquid and Gaseous States of Matter," by Dr. Andrews, F.R.S. Dr. Andrews was a gifted pioneer in this subject, and our reverence for him and his work is deep and profound. This was in 1870. Now mark: in 1902—thirty-two years after—"The Liquefication of Gases and the Continuity of State" was the subject of the inaugural address to the British Association in Dr. Andrews' own city of Belfast, by Professor James Dewar, the then President of the British Association. Could any praise be greater than that? I cannot pass by the name of Andrews without notice of how much the Club owes to the work of his daughter, Miss Mary K. Andrews, as an accomplished geologist. The Club's builders were not all men.

In 1886 the Club published in a collected form in one volume, the Appendices to the Reports, and as it represents so much and valuable labour on the part of the Club's builders I may be pardoned for reading a portion of the list.

Appendix I.—A list of the Irish Liassic Fossils, with notes on the new and critical species, by Ralph Tate, Assoc. Lin. Soc., F.G.S., &c. Plate I.

,, II.—A list of the Irish Liassic Foraminifera, by Joseph Wright, F.G.S., F.R.G.S.I.

,, III.—A list of the Fossils of the Estuarine Clays of the Counties of Down and Antrim, by Samuel Alex. Stewart, F.B.S.Edin.

Appendix III.—A list of the Mosses of the North-East of Ireland, by Samuel Alex. Stewart, F.B.S. Edin.

" " —A list of the Cretaceous Microzoa of the North-East of Ireland, by Joseph Wright, F.G.S., F.R.G.S.I. Plates II. and III.

" IV.—Recent Foraminifera of Down and Antrim, by Joseph Wright, F.G.S., F.R.G.S.I. Plate IV.

" " —Correlation of the Silurian Rocks of County Down, by William Swanston, F.G.S., and Charles Lapworth, F.G.S. Plates V., VI., VII.

" V.—A list of the Post-Tertiary Foraminifera of the North-East of Ireland, by Joseph Wright, F.G.S., etc.

" " —A list of the Mollusca of the Boulder Clay of the North-East of Ireland, by Samuel Alex. Stewart, F.B.S.Edin.

" VI.—A list of the recent Foraminifera from South Donegal, by Joseph Wright, F.G.S. Plate VIII. (in part).

" " —Sponge remains from the Carboniferous Strata of Ben Bulben, near Sligo, by Joseph Wright, F.G.S.

" " —Fossil Sponge Spicules from the Carboniferous Strata of Ben Bulben, near Sligo, by H. J. Carter, F.R.S., &c. Plate VIII. (in part).

" VII.—Supplement to a list of Mosses of the North-East of Ireland, by Samuel Alex. Stewart, F.B.S.Edin.

" VIII.—Notes on Irish Coleoptera, by A. H. Halliday, F.L.S.

" " —The Cromlechs of Antrim and Down, by William Gray, M.R.I.A. Plates IX to XX.

Appendix VIII.—Notes on the Pre-Historic Monuments at Carrowmore, near Sligo—the Battlefield of Northern Moytura, by Charles Elcock. Plates XXI. to XXIV.

„ IX.—Recent Ostracoda of Belfast Lough, by Samuel M. Malcolmson, M.D. Plate XXV.

„ „ —The Fungi of the North-East of Ireland, by Henry William Lett, M.A., T.C.D.

„ „ —Foraminifera of "Protector" Cruise, from Rockport, Belfast Lough, by Joseph Wright, F.G.S. Plate XXVI.

„ „ —A list of the Cretaceous Microzoa of Keady Hill, County Derry, by Joseph Wright, F.G.S. Plate XXVII.

„ „ A list of Irish Coleoptera, by the late Robert Patterson, F.R.S.

Those who understand such labours will at once recognise what these Appendices mean, and their value to scientific research. If the Club had done nothing else than these, it had done well indeed. Mr. Wm. Swanston and Mr. F. W. Lockwood, who were mainly responsible for the labours of publication, said "they earnestly hoped that it might not only prove useful to such as are commencing to investigate, but that it might stimulate to further exertion those who had been long engaged in the work." That the work is still one constantly referred to, points to the realisation of these hopes.

In 1871-2 I find that the Club took active measures to support Sir John Lubbock's Bill for the better preservation of historical monuments and remains of antiquities in Great Britain and Ireland, and following on it might we not make a movement, recently suggested to me, to secure that in the present changing conditions between landlords and tenants in Ireland, provision might be made to conserve all antiquities in the various County Councils?

The first decade ends with the preparation of a petition to the Right Hon. W. E. Gladstone in favour of Sir John Lubbock's Bill.

I find the following men of note also read papers in this decade, and some, like Messrs. Gray and Stewart, were very prolific in this respect, namely, Robert Young, C.E., G. V. Du Noyer, Canon MacIlwaine, Dr. Holden, Shakespeare Wood, Professor Wyville Thompson, W. J. Knowles, Dr. H. S. Purdon, J. J. Murphy, Professor J. Thompson, and Joseph Wright, F.G.S.

The second decade opens with the initial steps in the preparation to receive the British Association in 1874, and also with the perpetual wail about members not paying up their subscriptions in due time. I trust we have greatly improved since then.

In 1873-4 Mr. Gray and Mr. Robinson were appointed official representatives of the Club to the British Association, to obtain full information about the working of that Society and the methods of preparing for them, so that, as far as the Club was concerned, no stone should be left unturned to make the approaching visit successful in every respect, and it is the first connecting link between our Club and that great Association, and our subsequent relations have always been close, cordial and friendly, and I hope they will ever continue so.

The Committee also decided to publish a "Guide to Belfast" in connection with the visit of the British Association in 1874, and they also resolved that 500 copies should be distributed gratuitously to the non-resident members of the British Association. This reference is important, as this Guide was the first of its kind ever published under similar conditions, and it shows how earnest were the Club's builders and how willing they were to undertake gratuitously laborious and almost endless work. This initial movement of publishing Guides has been upheld ever since in every city that the Association has visited, and I consider it a splendid tribute of praise to our Club builders and a great recognition of their far-sightedness.

The Winter Session of 1873-4 opened on the 19th November, when Mr. Gray read a paper on "The British Association, its aims and objects." This paper was in reality Mr.

Gray's first report to the Club as its first representative to the British Association meeting at Bradford that year, and he has been our representative on many subsequent occasions.

The minutes detail the labours of the Club on the Guide Book, and we might mention that it cost £156. 11s. 1d., and that the assets in connection with it were £158. 15s. 11d. Of course the Local Committee of the British Association contributed to the cost of the work.

Not only did the Club produce a Guide Book, but it undertook to form an exhibition of antiquities, for which the Local Committee of the British Association subscribed £100. This was successfully organised, not without much labour, and opened from the 20th to the 26th August in the Ulster Minor Hall.

The minute book records the Herculean efforts of our Club members to render the British Association visit a success. That visit was rendered famous by its addresses and will ever be a red-letter one; but after all the Club did and the pains it took, and the concise minutes of the Committee on the subject; with the exception of a reference to it in Canon MacIlwaine's opening address of the Winter Session, the minutes are absolutely silent on the actual visit and the part the members took in it. Mr. Wm. Gray was Secretary then; he may possibly explain why he did not write up the minutes.

At the General Meeting on the 28th April, 1875, Mr. Gray was elected Vice-President, and I find that it was reported in the papers that Mr. Joseph Wright said on that night: "I think it is well that we should take a glance back and note the part taken by Mr. Gray in the working of the Club since its formation, when it was comparatively weak, until the present time, when it opens its present year a strong, flourishing society, with an established and creditable reputation amongst naturalists, not only in this country, but even beyond the boundaries of the United Kingdom." Mr. Wright also said that "the exhibition of antiquities in the Ulster Minor Hall and the preparation of the Guide to Belfast and adjacent Counties constituted the most important scientific

work done in Belfast for the reception of the *savants* who attended the meetings of the Association. These would not have been attempted save for Mr. Gray's energy and special knowledge."

In 1880 an important Conversazione was held, when a motion was made that the collection of exhibits should be open to the public on the following day, and I believe it was successful. A charge of 6d. was made for admission, and at that rate it was attended by 98 visitors. I mention this as at our last Conversazione I heard many regrets that the exhibits would not be available for inspection on the following day.

At this meeting the system of making one particular branch a special feature was adopted, that year Limestone being the subject, and the next year Igneous and Metamorphic Rocks. We abandoned this system in the present year, preferring a general collection of subjects, as giving the members a better opportunity of exhibiting.

In this year Mr. Hugh Robinson retired from the Secretaryship, with great regret on the part of the Club. That he was one of the great builders of the Club is manifest, as the trail of his work is strongly marked, running through the minutes of his term of office; and in the same year our valued friend, Mr. Wm. Gray, took the Presidential chair.

Mr. Gray occupied the chair also in 1880-81, when his address was on "Our Club," so that in a measure I am following in his footsteps. I find that his address was not a bit too modest, and only long enough to fill four and a half columns of the "Northern Whig." I shall not read it all to you, but I cannot help saying that he emphasises the excursions' scheme as "the most characteristic feature of our organisation."

I cannot spare time now to touch on them, but their records in the minutes bear out Mr. Gray's statement, for they were full of life and action. This was 23 years ago, and I ask attention to one short paragraph in this remarkable address, remarkable for the fields it travelled over, and the clear-sighted vision and grasp of a subject, especially in some

branches now only being reached by the thinking public. One cannot help admiring the man who sees how things should be and is not afraid to proclaim them. He said:—"In addition to all the wants I have already detailed, our crowning deficiency is the want of a Town Library, in fact a Free Public Library. In these days of primary, intermediate, and higher education it should be wholly unnecessary to advocate the necessity of libraries. We denounce all systems of cramming, and insist that the education of the school-room should be but the foundation on which, or the scaffolding by which the intellectual superstructure shall be subsequently erected, through a proper use of observation and books, but unless the student has a ready access to books his education is a sham." I venture to say that he still holds these views, which are now taking root, and the education question is becoming the most important one of the times.

I find that in October, 1882, the Club protested against the mutilation of the Giant's Causeway, and called the attention of the owner, Lord Antrim, to it, and this watchfulness over natural and historical monuments has ever been one of the potent works of the Club.

The 23rd April, 1883, the twentieth anniversary of the foundation of the Club, saw the following well-known names as office-bearers of the Club, and I mention them as they appear midway in its life, and all have done yeoman service as builders of the Club:—W. H. Patterson, President; Canon Grainger, Vice-President; Joseph Wright, Treasurer; Wm. Swanston and F. W. Lockwood, Secretaries. Committee—W. A. Firth, Wm. Gray, Rev. H. W. Lett, James Moore, M.D., Daniel M'Kee, George O'Brien, J. J. Phillips, Hugh Robinson, S. A. Stewart, S. M. Malcolmson, M.D.

During this decade I find the following names amongst the lecturers:—Joseph Wright, W. F. Wakeman, Dr. T. H. Keown, Canon MacIlwaine, W. J. Knowles, Mann Harbinson, S. A. Stewart, W. Swanston, J. J. Phillips, J. Browne, W. Gray, J. R. Robinson, Robert Day, F. W. Lockwood, Canon Grainger, Rev. H. W. Lett, Rev. J. Andrew, Thos. H. Corry, and Charles Elcock.

In 1885 "The Flora of the North-East of Ireland," by S. A. Stewart and the late T. H. Corry, was published under the direction of the Club, and is a lasting mark of the labours of these men, who worked so thoroughly for the Club, and to do more than mention this book would be superflous, as it is still a standard work, and much sought for; and, with the exception of the work already mentioned, and the two Guides, is one of the few scientific publications as yet produced by the Club. It is a memory often recalled with sadness that one of its gifted authors, young Mr. Corry, met an untimely death while investigating his favourite subject. Like a true man he died in harness, and the Club mourned the loss of one of its sincerest builders. I remember well his paper on sensitive plants, the only time I ever saw or heard him, and his thrilling, rapturous manner and his expression of reverence for the Great Creator's work made a lasting impression on me.

At this point I should like to have it clearly understood that in bringing forward the names of the more prominent workers I by no means undervalue the works of the large battalions that followed their captains in the field.

We have all heard the story of the mutual work of the organist and his bellows-blower, how when the latter said "Didn't we play that well?" he received a rebuke which made him, in the middle of the next piece, stop blowing to say to the Musical Doctor, "Is it we now, sir?" A facetious hodsman once actually said to me, "Ain't *we* building that spire well, sir?" These men were at least doing their duty, and without them the tune could not be played, nor the spire erected.

If anyone wants to know what these lesser Club builders do, go out into the field with them, especially on the excursions of the sections, and you will soon learn. Perhaps you will find, as I did, how much they can teach you, and how willing and strong their helping hands are, especially to beginners who seek to work beside them.

If I omit now a complete roll-call of them it is because, as I said, I must condense everything, to keep within an hour.

It is a mistake to imagine that the real work of the Club is made up of gay summer excursions through woods, by rivers, over mountains, or along the rugged capes of the North—or by reading papers, or inflicting an inaugural address. The real power is like the blood, ever moving and throbbing along the unseen veins, in the full flow of life, and when it stops, the structure will fall and its existence will be a thing—a memory —of the past.

I must glance hastily over the years of the third decade, and I find that of marked importance are the restoration of the Dromore High Cross and the investigation of the Larne Gravels and Estuarine Clays, on which a report was submitted by Mr. R. Ll. Praeger on the 19th November, 1899, illustrated by photographs, diagrams, fossils, samples of all beds, and flint implements. On the same date the same gentleman gave a notice of the occurrence of the Stock-Dove in the County Antrim. It will be seen that Mr. Praeger, in his manly share of the Club building, was a many-sided worker, keenly alive in his numerous specialities and indomitable in his perseverance to gain the right end of all he put his hand to.

I find that this decade was full of hard-toiling workers in every section, and the minutes in consequence are teemingly full of interest, but it is as impossible a task in this brief, imperfect glance to touch on all as it would be to mention each brick in the construction of a house. We may, however, mention the Microscopic Section as strongly to the fore, and the Botanical work was active and productive, and at times lively and festive.

The Archæological Section was as sharply on the look-out as ever and did good work.

In the year 1892 a decided step in advance was attained when the Club recognised the advent of the *Irish Naturalist*, edited by G. H. Carpenter and R. Ll. Praeger, and constituted it our official organ, which it has been ever since, with its pages generously open to all who wish to contribute to it.

This decade (the third) produced lectures from, amongst

others, J. Vinycomb, R. Ll. Praeger, Starkie Gardner, Robert May, Rev. C. H. Waddell, etc., and the last decade was embarked on at the high tide of prosperity, and as the old Museum was inadequate to meet the growth of the Club, the Conversazione changed its locality to the Exhibition Hall.

In 1893 the Club lost, in a great measure, the assistance of one of its best workers by Mr. Praeger being transferred to Dublin, but he never forgot his old friends and association, and has given many a helping hand since. Personally I have found him a most generous and helping friend, always ready to give his information in a manner that made it a pleasure to ask for it.

We find in the Session 1894-5 that the Geological Section organised a course of lectures by Professor G. A. J. Cole, and the Botanical Section was successful in the course of lectures by Professor T. Johnson, of Dublin. These were steps in the right direction, and I strongly urge the Club to consider now if it cannot carry on the same work. I know as a fact these lectures created many geologists and botanists, and therein lies the value of the work. They are good things that one cannot have too much of.

We may here mention that another Club builder comes well to the fore with untiring energy, great enthusiasm, willing, helpful, and thoughtful consideration for others, in the person of Miss Sydney M. Thompson (now Madame Christen), who was not only a worker herself but the cause of work in others, and when eventually her place of residence was changed to Scotland, the members felt how great her labours had been. She was an accomplished artist, a keen botanist, and a still keener geologist, and never so happy as when surrounded by workers whom she could help and encourage.

On the 29th October, 1899, two minutes are recorded that must not be allowed to pass unnoticed, namely, "That the Club make a record of its satisfaction for a grant given to Joseph Wright from the Royal Bounty, on account of his services to Science." That I consider is a proud record for the Club, and any Club might envy the membership of Joseph

Wright. The next is that "It was moved that steps be taken to invite the British Association to hold one of their meetings in Belfast, suggesting 1901." This shows that the active spirit of the Club is always to the front and generally the first to move in public matters of this kind.

In 1899 were instituted half-hour "Science Gossips" before the ordinary meetings for the purpose of creating more friendly relations amongst the members, and the plan has worked well ever since. In this year the Geological Section opened their Winter Session with an inaugural lecture by Professor Cole, in the Grosvenor Hall, which was well filled at popular prices.

This brings us down to 1900, under the Presidency of the Rev. C. H. Waddell.

During the following three years the chair was occupied by Mr. F. J. Bigger, to whom the Archæological Section in its later years owes so much, and during whose Presidency the British Association again visited Belfast, in 1902, for which visit the Club claims the initial movement. What the Club did for this visit of the British Association, in the persons of Mr. Robert Patterson, Mr. R. Welch, Mr. Wm. Gray, and several others will be long remembered, and the Guide Book of that year will at least hold its own till the next visit of the British Association, as the first one did.

It is hardly necessary to comment on its latter years. It is sufficient to say that we one and all hope the future life of the Club will be based on its past work, and that as Nature seems inexhaustible in her store of riches, and wide and boundless in her fields of research, so we trust that there will be no lack of workers, no standing still, but a united body, ever working, ever advancing, and always with the bright, breezy spirit, and the cheery mutual help that kept together the old Builders of the Club.

At the conclusion of the address Mr. William Gray, M.R.I.A., referred to many past interesting occurrences of which he had personal knowledge, and Mr. William Swanston, F.G.S., also spoke.

The election of Rev. George Duncan, Messrs. E. Cunningham, E. J. Elliott, Thomas M'Gowan, and Philip Johnston to membership brought the procedings to a close.

Previous to the meeting the usual Science Gossip half-hour was held in the new Club Room.

"BIRDS: THEIR STRUCTURE, FLIGHT, AND HABITS."

The second business meeting was held on 15th December, in the Museum, when Mr. David C. Campbell, of Londonderry, lectured on "Birds: their Structure, Flight, and Habits." Mr. William Gray, M.R.I.A., who presided, suitably introduced Mr. Campbell, who first touched upon birds in general, and showed what an important place they occupied in the economy of nature. The land was cheered by their songs; scenes that were dull and inharmonious were changed by the flash of bright feathers and the fluttering of flying wings. How dreary the winter shore without the gleam of the sea-birds' pinions; how we welcomed the swallow in the spring and admired the robin in winter! From birds the poets had received inspiration and the wise lessons. So far as scientists had discovered, there were between 12,000 and 13,000 different species of birds found upon the globe. Some were only found within comparatively small areas; some inhabited zones, and were only to be observed within certain parallels of latitude; but many were freely cosmopolitan, and dwelt in every continent. Owing to their marvellous powers of flight and endurance, birds were able to traverse vast regions and to penetrate into parts of the globe hitherto unexplored by man. Should the North Pole ever be reached by an explorer, it was probable that the only warm-blooded animals found in its neighbourhood would be birds. People in the British Islands were particularly well situated for studying bird life, largely owing to their insular position as the outpost of Europe, and also to their comparatively mild winters. Out of a total of

700 European birds the British Isles could claim 371 species, and Ireland 290 species. Some of these had only visited our land, it might be, a few times, while others were common and widely distributed. Of the 371 British species 370 inhabited other parts of the world, the one species limited to the British Isles being the common red grouse. Everyone was more or less familiar with the different types of birds. In the Tropics they found the most brilliant colours; the birds of paradise in the Old World and the humming-birds in the New World showed the most strikingly beautiful hues to be found in nature. But, although conspicuous for dazzling coats, the tropical birds did not excel in song, almost all the good songsters being confined to the temperate zone, and included amongst the birds of comparatively small size, such as the lark, thrush, blackbird, robin, &c. If they examined a bird they found that in outward form and expression it differed from all other creatures, though in structure it resembled in some measure all vertebrate animals, but most nearly approached the reptiles in its anatomy, though, unlike them, warm-blooded and very active and graceful in its movements. In examining a bird's structure, one of the most striking points was the very deeply-keeled *sternum*, or breastbone, possessed by the great majority of species. This deep keel was to carry the enormously-developed breast muscles, which enabled a bird to fly and to remain on the wing, it might be, for fifteen hours at a stretch, and to cover many hundreds of miles in one sustained flight. Another very interesting point in the bird's structure was the ingenious arrangement of the tendons of the leg, by which the bird was able to retain its hold upon a branch while asleep, so that the more profoundly the bird slumbered the more secure was its hold. Taking the bird's outward aspect, the most fascinating feature was the eye. It was usually beautifully bright, and was often piercingly keen. In many of the small singing-birds it had a liquid softness, which he did not think was found in the eyes of any other animal. Birds alone of all animal beings might be truly said to fall asleep in death. When man or any mammal expired

the eyes remained wide open; only birds closed their eyes in dying. The lecturer also referred to the feathers of birds, which varied much, some being for warmth, some for flight, and some for ornament; and touched upon the great and absorbing efforts of the bird to obtain food. Most of the small birds were good friends to the farmer and gardener, as they destroyed myriads of insects, while the gulls acted as splendid scavengers, clearing off the decaying garbage that would bring disease and plague to many a fishing village and seaside town. Taken all round, birds were among the most beautiful objects which the Creator had given them, and nobly fulfilled their part in keeping up the wonderful balance of nature.

The lecture, which was illustrated by a large number of lantern slides, shown by Mr. A. R. Hogg, was listened to with great attention, and at its close Mr. Welch and Mr. N. H. Foster referred to it in laudatory terms.

Messrs. Burton Sefton and William M. Campbell having been elected members, the proceedings terminated.

"VARIETIES IN BRITISH FERNS."
"SOME SOUTERRAINS IN ANTRIM AND DOWN."
"BIRDS AND NESTS."
"NOTES ON THE DISCOVERY OF DOPPLERITE IN SLUGGAN BOG."

The third meeting of the Winter Session was held in the Museum on 19th January, when four short papers were read. The President (Mr. W. J. Fennell, M.R.I.A.I.) occupied the chair, and there was a large attendance of members and friends.

The first paper was by Mr. W. H. Phillips, on "Varieties in British Ferns." Mr. Phillips said on the excursions of the Club one is often asked the following questions:—"Do you still take as much interest in ferns?" "How many species are there?" "How do you know the differences; they all appear

the same?" "How can you remember all the hard names?" I answer, yes. Of species there are in Britain 44 and in Ireland 33, yet the varieties of these are unlimited. If you look at them closely it is quite plain there are well-marked differences. The names are comparatively easy to remember, as in most cases they are derived from Latin or Greek words, which describe some prominent form, and constant use soon improves the memory. These questions having been asked me at Woodburn excursion by one of the members, as we walked through a green lane with ferns on both sides, I pulled a frond of *Lastrea dilatata*. After examining this I pulled another frond of *Athyrium*, and, putting them side by side, the differences were very marked. Then fronds were successively pulled of *Lastrea*, *Polystichum angulare*, *Polypodium*, &c., and, arranging them in a line, the differences were plainly seen. Shortly after a very fine plant of *Polystichum aculeatum* was found, and, on it being suggested that it should be taken by one of the ladies, a learned Professor of the party extracted it from its habitat among the roots of the thorn hedge. A very nice attenuated form of *Athyrium* was found close by, which was also taken. These episodes furnished the idea of this short paper on some of the numerous varieties of British ferns, many of which are to be found growing wild, and others raised artificially by sowing mixed spores of various varieties. It is really astonishing how few people, even among plant lovers, are aware that in our British ferns and their varieties we have something absolutely unique in the world, and unparalleled anywhere outside our little group of islands. We have such a wealth of beautiful ferns at our disposal; but on the principle that a prophet has no honour in his own country we practically ignore the gift it constitutes at the hand of beneficent nature. We admire the beauty of the lovely exotic ferns which have been introduced, but it is a ridiculous state of things that a charming fern found abroad is eagerly snatched up, while an equally fine thing found in our native fern haunts is absolutely ignored except by the coterie of enthusiasts. Our

native ferns have immensely advanced and improved. At the beginning of the nineteenth century ferns generally were an enigma to the biologist, and their varietal capacity only known to a small extent, contemporary books only referring vaguely to a few "monstrosities," which might be reckoned on the fingers. In the middle of the century and onwards varieties became the study of the pioneers, and some scores of fine forms have been found and many more have been raised. Since then only a few fern lovers have sustained the cult, and it is hoped that during the present century there will be a fuller appreciation as the outcome of their labours. The varieties are often called "sports," and by some "monstrosities" and "diseases" but on careful examination such terms cannot be rightly applied to those beautiful forms which are the pride of every grower. From observation it is found, as a rule, that the offspring of the ferns, like those of other organisms, resemble their parents so closely as to be generally indistinguishable from them in their specific characters, but this is by no means always the case, since on careful examination of wild plants growing under perfectly natural conditions, very extraordinary departures from the normal forms are found under circumstances which leave no doubt whatever that they have originated with their widely-marked peculiarities, fully developed, direct from a spore off the surrounding normal forms. The two most striking varieties of *Athyrium* (*victoriæ* and *acrocladon*) are examples of this, and so are all the entirely barren forms, such as the many wild finds of the frilled or crisped *Scolopendrium*, *Polypodium*, and others, which must have originated from normal spore-bearing forms. To such a wonderful extent has this variation been exhibited that at present our British species, few as they are, have yielded many thousands of absolutely distinct forms. It must not be imagined for a moment that these varieties are finely-drawn differences only appreciable to the eye of an expert; they represent differences in form, often far greater than those between separate families altogether, and ranging in a single species so widely that a

long narrow strap at one end of the scale, and a round ball of moss at the other, constitute the extremes of form assumed. These variations having been obtained, it is found that they are governed by laws, and that in these variations there is a similarity of forms running through all the species of ferns, and that they come true to their parent plant. The following list will show some of the generally accepted sub-divisions of discoveries hitherto made in the most important species:— Plumose and frondose, divided and decomposite, imbricate and orispate, lax and flexuose, deltoid and brachiate, cruciate, interrupted and deficient, crested and ramose, &c. By way of illustration let us take the four species in which alone all these marked characters have as yet been known to occur. These four are *Polystichum angulare*, *Polypodium vulgare*, *Athyrium filix-fœmina*, and *Blechnum spicant*. *Polystichum angulare* is the species in which, on the whole, these characters have appeared in the greatest variety, and undoubtedly, with the exception of the cruciate class, they have been developed to the greatest perfection.

The paper was illustrated by a number of fresh fronds from the writer's large collection.

Mr. R. Welch spoke of the luxuriant growth of *Scolopendrium vulgare* at Ben Bulben, and Messrs. A. Milligan and W. Gray also criticised the paper. Mr. Phillips, in his reply, mentioned that many interesting *crispum* and *marginatum* varieties of the *Scolopendrium* had been found in Co. Sligo in the neighbourhood of Ben Bulben.

Mrs. B. Hobson then read a paper entitled "Some Souterrains in Antrim and Down," in which there was a description of a large number she had visited—some at Tyrella and Cloughey, in County Down, and others near Antrim, and in the districts round Connor and Glenan, besides two or three near Belfast. The paper was illustrated by lantern slides, a number of which were kindly lent by Mr. Fennell, Mr. Welch, and Mr. W. A. Green—the latter gentleman having prepared a few for the occasion. The writer herself had measured and made sketches of quite a number,

and from these sketches her daughter, Miss F. F. Hobson, produced some carefully prepared plans, which were photographed and thrown on the screen. There are a great number of souterrains both in County Antrim and County Down. They are so numerous along the valley of the Sixmilewater and in the neighbourhood of Connor that the country seems honeycombed with them. Their preservation can be accounted for partly by their being underground, but chiefly by the superstitious reverence with which they are regarded, a large number of people believing that any interference with them would lead to some calamity either to their families or cattle. The uniform character of these cave-dwellings or hiding-places was referred to, also some instances where uniformity was departed from and a second story added to the structure. The writer also made reference to some prehistoric burial places at Newgrange, Giant's Ring, &c., in order to point out the similarity of structure between these and the souterrains, and women were invited to pursue this interesting investigation, as they are treated with more hospitality than falls to the lot of the mere man.

The President referred to the careful measurements of these souterrains by Mrs. Hobson, and also to the plans drawn by Miss Hobson, the first Belfast lady architect. Miss Andrews enquired as to the folk-lore connected with these erections, Messrs. Gray and Welch spoke favourably of the paper, and Mrs. Hobson briefly replied.

The third paper was by Mr. W. H. Workman, M.B.O.U., on "Birds and Nests." It was illustrated by many lantern slides, most being original. In the course of his remarks, Mr. Workman said the macaws are a group of the parrot tribe from South America, and are not good talkers. He had seen in the Zoological Gardens in London a black cockatoo said to be thirty-two years old. Pelicans are to be found in nearly all the tropical regions of the world, and their bones have been discovered in Norfolk and Cambridge, indicating that comparatively recently they were, at least, occasional visitors to England. The great black-backed gull is now rather rare

on the West Coast of Scotland, and had only a few times come under his observation. Mr. Thom, the owner of the Island of Canna, kept a pair for some time, one of which he observed swallowing three starlings one after the other, and so pugnacious were they that strangers were afraid to cross the field in which they were kept. The starling is a comparatively new bird in this country, and during the past fifty years has greatly increased in Ireland and Scotland. The warbler family is one of the largest groups of birds, having representatives in all the continents. The bullfinch's nest which he found in the Isle of Mull was placed in a small fir tree, neatly constructed of roots and grass, and contained four eggs. The greenfinch is much more common here, and frequently places its loosely made nest in laurels. The eggs are four to six in number. In Algeria he had found a much larger and brighter sub-species, known as *Ligurinus aurantuventris*. In Ireland the linnet is a common species, and is greatly sought after as a cage bird, being generally known as the "grey." In Ross-shire it is very scarce, and it appears to be local in the Hebrides, though common in the Orkneys. The reed bunting may be seen any spring day in the willow swamps along the banks of the Lagan. Its pretty eggs are purple-grey, boldly streaked with purple-brown. The spotted flycatcher is a well-known bird, and no doubt all have observed it as it sits on a stump or the back of a garden seat flying off every minute to catch some passing insect, which it rarely misses, and returning to the same perch. The nest is composed of grass lined with hair, and the eggs are four to six in number. Pheasants' and partridges' eggs have been found in the same nest, as in the picture shown on the screen. The Norfolk plover is a rare visitor to our shores. According to Mr. Ussher, it has only been recorded ten times in Ireland, in nearly every instance on the East Coast, but it is much more common in England. The eggs, usually two, are generally laid in a hollow scratched in heath lands. The little grebe or dabchick constructs a floating nest, which is moored to reeds or branches. Its eggs are

white when fresh laid, but soon become dirty brown—stained by the decomposing vegetation of which the nest is composed, and with which the bird covers them over when she has occasion to leave the nest. The black-headed gull is the commonest of the gulls in the North of Ireland. In the breeding season it leaves the coasts and frequents inland waters, where it constructs its nest of grass. It is a common winter visitor to our gardens during severe weather, where, in a few seconds, it will finish off all the food put out for the smaller birds. At this season the black head is only indicated by a few black feathers on the nape of the neck.

Mr. Robert Patterson said the great black-backed gull was well known in Rathlin Island, where it awaited the arrival of the young lambs, which it attacked and devoured, consequently this bird was not looked upon favourably by the inhabitants. Mr. W. Gray referred to the duration of life of gulls, and said he had seen one alleged to be upwards of thirty years old. Mr. N. H. Foster spoke of game birds frequently laying their eggs in the nests of different species, and instanced a mallard's nest observed by him in which a pheasant had laid three eggs. Mr. J. Hamilton spoke favourably of the paper, and Mr. Workman, in his reply, stated that the views he had shown were the result of many years' observation, but he hoped to add to them in the coming season.

The fourth paper was entitled "Notes on the Discovery of Dopplerite in Sluggan Bog." by Mr. Robert Bell. Mr. Bell said that Sluggan Bog, in the parish of Drummaul, is the largest bog in County Antrim, containing upwards of one thousand acres. This district was the scene of a remarkable bog-burst which occurred on the 19th September, 1835. The peasantry of the neighbourhood were much alarmed, as a large body of the bog moved rapidly towards the River Main, covering up corn fields and meadows and roads, in some places to a depth of twenty feet. The bog offers a tempting field for research to naturalists. A road cutting at Ballylurgan shows a fine section of peat resting on tough Boulder Clay containing many erratics of a North Antrim type. While searching

amongst the peat in Mr. M'Groggan's peat farm Mr. Bell discovered a peculiar black layer of the consistency of stiff jelly. Further investigations showed that this material occurred *in situ* at a depth of seven feet below the surface. It was about three inches in thickness, thinning out irregularly to the adjoining peat. The substance is like a velvety black jelly, and breaks with the conchoidal fracture peculiar to amorphous substances. As it was unknown to local geologists, samples were sent to Mr. Moss, F.I.C., of Dublin, who made an analysis of it, and determined it to be Dopplerite, a substance hitherto unrecorded in Great Britain, though found in Switzerland and Germany. The discovery seemed of such interest that it was the subject of a paper read before the Royal Dublin Society.

Mr. W. Gray spoke of Mr. Bell's attainments in geological research, and complimented him on being the first to discover Dopplerite in the British Islands, and also referred the members to an article by Mr. Moss, which appeared in the *Irish Naturalist* (August, 1903). Mr. R. Welch mentioned that on his showing a specimen of this mineral to Mr. A. Stelfox, that gentleman said he had observed the same in a bog somewhere in the West of Ireland, but was unable to recollect the precise locality. Mr. May also spoke to the paper. Messrs. William Keatley and H. M. Robb having been elected members, the very successful meeting was brought to a conclusion.

"PLANT ASSOCIATIONS."

The fourth meeting of the Winter Session was held on 16th February, in the Museum, College Square North, when Mr. R. Lloyd Praeger, B.A., B.E., M.R.I.A., delivered a most interesting lecture on "Plant Associations, with Special Reference to the Vegetation of Ireland." In the unavoidable absence of the President, the chair was taken by Professor Gregg Wilson, M.A., D.Sc., M.R.I.A., and there was a large attendance of members and friends.

Mr. Praeger, in the course of his lecture, said that almost the whole of the land surface of the globe, and, in addition, the shallower waters of the sea, were covered with a varied growth of plant life. The plant was a complicated organism, composed of a number of parts possessing different functions, and each part was adapted to the peculiar conditions under which it existed, and to the peculiar functions which it had to fulfil. It followed that the plant as a whole was a highly complicated machine, delicately adjusted to a large variety of environmental factors and internal conditions. The most important factors in the environment—cological factors, as they were now commonly called—were water, light, heat, and soil. Viewing the vegetation of the earth as a whole, heat is the most important factor in determining the character of the vegetation; but in any area of moderate size, such as our own Island, the small range of temperature caused the heat factor to occupy but a secondary place, and the question of water supply became the dominating influence. The number of possible combinations of the principal factors being limited, it followed that similar sets of conditions occurred over and over again, resulting in similar vegetation in places separated from each other. These groups of plants living in association on account of similar requirements were termed plant societies, or plant associations. Some species, being more completely adapted to prevailing conditions than others, were able to hold rivals in check, and hence they usually got in any plant association one or two dominant forms, with others holding subsidiary places. For instance, on our mountains the heather was usually completely dominant, but as they descended towards the lower grounds changing conditions allowed powerful rivals to intervene, till they got the whin or bracken or an association of grasses or trees dominant. The special adaptations by which plants rendered themselves fitted for the conditions under which they live were very varied and highly interesting. Plants had to secure a sufficiency of water, of heat, of light, of food, and also to guard against an excess of all these. Taking the factor of water,

they could easily distinguish between those plants which had to guard against drought—xerophytes, as they were termed—from those whose habits of life were such that water was usually in excess—termed hydrophytes. The vegetation of sandy shores, of rocks, and desert places was essentially xerophile in character, while that of marshes and pools was hydrophile. Between these extremes lay the vegetation of our meadows, woods, and cultivated land, where the water supply neither greatly exceeded nor fell below the requirements of the plants; the plants composing such associations were termed mesophytes. The special adaptation of xerophytes consisted mainly of devices for obtaining the necessary supply of water, and for storing it and preventing its loss. Such plants had usually a well-developed root-system, and showed a reduction of their vegetative parts; the leaves, for instance, were small, sometimes rolled in, sometimes altogether wanting. A thick impervious skin was also very characteristic, or a coating of felty hairs. In hydrophytes, on the contrary, they found a very thin skin and a reduced root-system. Mr. Praeger then briefly sketched some of the most characteristic plant associations of our own country, such as that of the sea-rocks, sand-dunes, salt-marshes, bogs, meadows, and woods, pointing out the leading conditions under which each plant-group lives, and its special adaptations to its environment. From that he passed to the geographical study of vegetations and the mapping of leading associations. The history of this branch of botany was briefly sketched, with a special reference to the work done in recent years in Scotland and in Yorkshire; and then an account was given of the mapping of the plant associations of the Dublin mountains, on which Dr. Pethybridge and he had been for some time engaged. Sheets of the Dublin plant survey and photographs of the associations were shown and methods described. In conclusion, the speaker strongly urged the claim of this branch of botany, hitherto untouched in the North of Ireland, on the members of the Club.

The Chairman referred to the work done by W. G. Smith, and said he had copies of that gentleman's papers

which he would be happy to give to any of the members interested, and he trusted some of those present would take up the study of this branch of botanical research. Mr. R. Welch spoke of the wind erosion in some of the mountainous districts, to which the lecturer had referred, and mentioned Divis, the col between Slieve Donard and Slieve Commedagh in the Mournes, and Knocklayd, where just now this phenomenon was worthy of close observation. Mr. S. R. Smith gave instances of plant growth in the Yeosomite Valley which had been observed by him. Rev. C. H. Waddell referred to changes in the character of the vegetation in Tollymore Park, caused by the cutting down of trees, whereby some species of plants were eliminated and other species appeared in their place.

Mr. John Hamilton exhibited a living toad and a young one bred in Belfast, and the difference between young toads and young frogs was pointed out by Mr. W. H. Phillips. Dr. W. Clark Robinson mentioned a case which came under his own notice, where some frogs were found in underground crevices under peculiar conditions.

The following five new members were elected:—Miss Kidd, Miss Leonora Kellett, Messrs. C. A. Mackenzie, Thomas Watters and Samuel Bradford.

"HELIX (HELICELLA) ZAKKARENSIS KOBELT."
"GEOLOGY AND SCENERY."
"THE INFLUENCE OF THE BELFAST NATURALISTS' FIELD CLUB IN PROMOTING THE ADVANCEMENT OF SCIENCE."

The fifth meeting of the Winter Session of the Club was held in the Museum, College Square North, on 15th March, when there was a good attendance of members and friends. Previous to the meeting the popular "Science Gossip Half-hour" was held in the adjoining new Club-Room, when there was a large series of British freshwater shells of the genus *Planorbis* exhibited by the conchological members.

The chair was taken at eight o'clock by the President (Mr. W. J. Fennell, M.R.I.A.I.), who intimated that, before the regular business commenced, he had a very pleasing duty to perform. It having come to the knowledge of the Committee that the esteemed Hon. Treasurer of the Club (Mr. W. H. Phillips, Lemonfield, Holywood) celebrated his golden wedding this week, they determined to present him with an illuminated address on the interesting occasion. Mr. Phillips had been one of the founders of the Club, and was first appointed Treasurer in 1864. This office, with a few years' interval, he has held ever since to the great advantage of the Club.

The following address, which had been prepared by Mr. John Vinycomb, M.R.I.A., a member of the Club, with his well-known artistic taste and good feeling, was read by the Hon. Sec.:—

Dear Mr. Phillips,

The President and Committee, on behalf of the Belfast Naturalists' Field Club, feel that they cannot allow the occasion of your golden wedding to pass without recording the long and valued services you have rendered to the Club during its existence.

One of the original members, you have filled most of the important offices in the Club, and since April, 1864, with short intervals, have rendered invaluable service as Treasurer, to which the success of the Club may, in a large measure, be attributed.

We also desire to express the hope that you and Mrs. Phillips may be long spared, and that your services as a member and Treasurer may be available to the Club, and to Science generally, for many years to come, with the same results that have so distinguished them in the past.

(Signed,)

W. J. Fennell, *President.*
Robert Patterson, } *Honorary*
Nevin H. Foster, } *Secretaries.*

Mr. Phillips replied as follows: —

Ladies and Gentlemen,

I feel it difficult to put in adequate language my thanks for the expression of your kindness, on the occasion of my Golden Wedding. This is an honour which I highly value, as it has never before been accorded to any member of the Club. I highly appreciate your kind references to my long connection with the Club as one of its earliest members, and my filling all the offices, and your recognition of the value of the services I have been able to render to the Club, always to me a great pleasure. I hope I may be able for some time to continue my services. On behalf of Mrs. Phillips I desire to thank you for your good wishes for the future; and I hope in the time to come the Club will flourish as it has done in the past.

(Signed) W. H. Phillips.

The first paper was read by Mr. R. Welch, on *Helix* (*Helicella*) *Zakkarensis*, Kobelt, who said—For many years past naturalists who take an interest in land-shells have carefully watched for any records of *Helix pisana* in Co. Down. This is an exceedingly local species, known in Ireland only on the coast sand-hills of the southern half of Co. Louth and along the Meath Coast, but which has never yet seemed to have succeeded in crossing Carlingford Lough, nor, indeed, to have reached North Louth. While Mr. Arthur W. Stelfox was collecting plants and land-shells near Rostrevor, early in February, 1898, he noticed a shell which looked like *Helix pisana* feeding among nettles in the *debris* of an old ruined cottage. The locality was about a mile or more inland on the road past Rostrevor House. The shell was evidently not full grown, as the lip was not formed; and on examination at home it did not seem to be like the species mentioned. The markings were quite different to those on shells found in the adjacent County Louth; that, however, in such a variable species would not have been of great importance, but there were others more noticeable.

The shell was carefully stored away and we again examined it lately, comparing it with various forms of *Helix pisana* and *Helix virgata*, from the counties south of Carlingford Lough. It was so different in many respects that we sent it to various experts for their opinions, which varied a good deal. The shell being immature made its determination evidently very difficult. Finally we sent it to Mr. A. S. Kennard, F.G.S., of the Conchological Society, London, in order that he might compare it with some from South-West Europe in the British Museum. This he kindly did, with the assistance of Messrs. Edgar A. Smith and B. B. Woodward, and I cannot do better than give Mr. Kennard's remarks on the search: "It was a great treat to name the shell. We at once rejected *Helix virgata* as clean out of it; it was a young shell, perhaps two-thirds grown, so it could not be that species. When we examined it with a lens and saw the fine *striæ* we rejected *Helix pisana*. Then came the question—What is it? Our first surmise was *Helicella affinior*, Debleaux, from Oran (Algiers), but it was not that, though near to it; a similar result was meted out to *Helix cyclostoma*, Bourg, from Oran. We could see after this that its affinities were North African, and then we found *Helicella zakkarensis*, Kobelt, from Dral-el-miyan, Kabylie, Algiers, and we cannot separate it from that form." This final search was in the fine Canon Norman collection which is now in the Natural History Museum. *Helicella zakkarensis* we see, from specimens kindly forwarded to us by Messrs. Sowerby and Fulton, to be much larger even than *Helix pisana*, the shell is not so high in the spire and the umbilicus is much broader. The larger specimen sent us measures 26 mm., a typical *Helix pisana* only 18½ mm. We hope to visit the locality and make a keen search to settle the question of its being possibly only an accidental introduction.

Mr. George C. Gough, A.R.C.S., F.G.S., then read a paper entitled "Geology and Scenery." He said the study of scenery was of interest to many besides the geologist. Scenery depended on geology, either directly or indirectly, and geology

was the cause of all modifications of surface configuration. These surface features were of great importance to the geological surveyor, even trivial details in the relief of a district being often of help, and as different kinds of rocks might be sculptured in characteristic ways, the trained geologist was often able to recognise at a distance the material which constituted some hill or mountain. The agencies which had given to this country its present form might be divided into subäërial and subterranean. The latter included the volcano and earthquake, which, however terrifying locally when they were in action, had comparatively little effect on the earth's crust as a whole. Most of the work was done by the subäërial or atmospheric agencies. These, which included rain, wind, and air, were quiet and long-continued, and, acting through immense periods of time, had been able to carve out their mountains and excavate their valleys. Variations in temperature had caused masses of rock to split off, which washed by rain into streams, had scooped out hollows in the beds of the rivers ("pot-holes") as well as helping to erode their beds and lower their levels. Rain, with carbon dioxide in solution, dissolved limestones, forming fissures and caverns, and also by dissolving the cement which bound other rocks together, disintegrated them. The wind helped by carrying sand, which carved and polished the rocks over which it passed. The sea around their coasts flung huge boulders at the cliffs, gradually undermining them, and eventually bringing them down, thus supplying it with fresh material to continue its work. All these agencies had been wearing down the country for countless centuries, and the question arose, "How is it that there is any land left?" The answer to that question was that molten rock was being poured out on the surface of the earth, forming what were termed igneous rocks; that the land was rising gradually in some places, and that all the material which was worn off the land was carried to the sea and laid down there in sheets and layers, which eventually might appear above the sea as sedimentary rocks. In past ages Ireland had many times been partly or wholly beneath

the sea, and had received such deposits which were now forming the present surface of the land.

The paper was illustrated by a fine series of lantern slides, the lantern being in charge of Mr. A. R. Hogg.

Mr. William Gray, M.R.I.A., contributed a paper on "The Influence of the Belfast Naturalists' Field Club in Promoting the Advancement of Science." He said there were about seventy provincial societies affiliated to the British Association and recognised by the Parliament of Science as "Corresponding Societies." They had been selected from societies qualified to further the objects of the association and publish the results of their investigations. The Belfast Naturalists' Field Club was one of the first appointed, and was the premier corresponding society in Ireland. Mr. Gray then proceeded to refer to the services rendered by the members of the Club in various departments of scientific investigation, and said they might fairly assume that its present and future members would combine to carry on the work so successfully done by their predecessors. The natural advantages of Belfast and neighbourhood as a corresponding centre, and the work achieved in it during the past hundred years for the promotion of science received attention, and the necessity was pointed out for the provision of better facilities for a closer study of nature in the district. In conclusion Mr. Gray referred to the use that could be made of specimens in connection with elementary education, and said by this and like advances in their normal work they would indeed become more closely identified with the educational movements of that day, and in a minor, but very important field, fulfil the primary object of the British Association for the Advancement of Science.

These papers were spoken to by the President, Messrs. W. Gray, Robert Patterson, R. Welch, and B. Hobson.

The election of Mrs. Bruce, Dr. J. E. MacIlwaine, Messrs. W. H. Milligan, John Russell, and William Christy concluded the meeting.

ANNUAL MEETING.

The forty-first Annual Meeting was held in the Museum on 19th April, when there was a very large attendance of members. The President (Mr. W. J. Fennell, M.R.I.A.I.) occupied the chair, and remarked that the last chapter of another year of our work was drawing to a close. He trusted the year that had gone by had been possessed of some attractions and pleasant memories for most of them, and that the year coming would carry them through more good work, and would bring to them additional pleasant memories. He then called on the Hon. Secretary to read the Annual Report, after which the Reports of the Botanical and Geological Sections were presented. Mr. George Donaldson read the Librarian's Report, and Mr. George C. Gough that of the Sub-Committee appointed to adjudicate on Collections sent in competition for Prizes offered in the Club's programme. In the absence, through illness, of Mr. W. H. Phillips, Mr. N. H. Foster read the Treasurer's Report.

The Chairman, in moving the adoption of the Annual Reports and the Treasurer's Statement of Accounts, said he thought when these were published they would represent one of the best reports they had had for many years. Although the Sections were not numerous, still he thought the Section Reports represented a very fair amount of work in the year, and he thought the Club might naturally congratulate the Sections.

Dr. St. Clair Boyd, in seconding the resolution, said he thought when they heard these reports read they could look forward with hope that some great names in science might spring from their Society in the future as in the past.

The resolution was spoken to by Mrs. Fennell, Messrs. Wm. Gray, George C. Gough, George Donaldson, and Robert Patterson, and carried by acclamation.

On the motion of Mr. W. H. Gallway, seconded by Mr. B. Hobson, Mr. W. J. Fennell, M.R.I.A.I., was elected Presi-

dent for the ensuing year. Mr. Robert Patterson, M.R.I.A., was elected Vice-President, on the motion of Mr. John M. Dickson, seconded by Mr. George E. Reilly. Mr. T. E. Farrington moved, and Mr. R. Bell seconded, the re-election of Mr. W. H. Phillips as Treasurer, and Mr. George Donaldson was re-elected Librarian, on the motion of Mr. H. Marshall, seconded by Mr. N. Carrothers. Mr. Nevin H. Foster, M.B.O.U., was re-appointed Honorary Secretary, on the motion of Mr. W. A. Green, seconded by Mr. W. P. Johnston, and Mr. James Orr was elected his colleague, on the motion of Mrs. Fennell, seconded by Mr. Alex. Milligan.

The Chairman proposed a hearty vote of thanks to Mr. Robert Patterson, the out-going Secretary, and said they were all grateful to him for the splendid services he had rendered to the Club during his three years' term of office. Miss Walkington, LL.D., also thanked Mr. Patterson, on behalf of the lady members of the Club, for his unfailing courtesy and attention to their comfort on the excursions.

The resolution was carried with much applause, and Mr. Patterson suitably replied.

A ballot was then taken for ten members of Committee, and the following gentlemen were declared elected:—Messrs. Robert Bell, W. H. Gallway, George C. Gough, A.R.C.S., F.G.S., W. A. Green, Alexander Milligan, H. Lamont Orr, George E. Reilly, Robert Welch, Prof. Gregg Wilson, D.Sc., M.R.I.A., and Mr. Joseph Wright, F.G.S.

Several suggestions were made by members as to places likely to prove of interest for the Summer Excursions, and they were referred to the Committee to make a selection.

Mr. Gray moved that the Committee put themselves into communication with the City Council, and suggest to them the desirability of properly arranging, classifying, and naming the Grainger Collection, with a view to developing its educational character. The motion was seconded by Mr. John M. Dickson and passed.

The following new members were elected:—Rev. J. D.

Craig Houston, Messrs. V. H. Macoun, E. J. M'Kean, and W. H. Turtle, and this concluded the business of the meeting.

A number of interesting views of Sligo and its neighbourhood—where it is arranged that the Triennial Conference of the Irish Field Club Union will hold its meeting in July—were then thrown on the screen, Mr. Welch describing the places and giving a most interesting account of their rich and varied fauna and flora, the lantern being manipulated by Mr. A. R. Hogg.



RULES

OF THE

Belfast Naturalists' Field Club.

(1903-4).

I.

That the Society be called "The Belfast Naturalists' Field Club."

II.

That the object of this Society be the practical study of Natural Science and Archæology in Ireland.

III.

That the Club shall consist of Ordinary, Corresponding, and Honorary Members. The Ordinary Members to pay annually a subscription of Five Shillings, and that candidates for such Membership shall first pay an entrance fee of 5/-, and be proposed and seconded at any meeting of the Club, by Members present, and elected by a majority of votes of the Members present.

IV.

That the Honorary and Corresponding Members shall consist of persons of eminence in Natural Science, or who shall have done some special service to the Club; and whose usual residence is not less than twenty miles from Belfast. That such Members may be nominated by any Member of the Club, and on being approved by the Committee, may be elected at any subsequent Meeting of the Club by a majority of the votes of the Members present. That Corresponding Members be expected to communicate a Paper once within every two years.

V.

That the Officers of the Club be annually elected and consist of a President, Vice-President, Treasurer, Librarian, and two Secretaries, and ten Members who form a Committee, and shall hold not less than eight Meetings in the year. Five Members to form a quorum. No Member of Committee to be eligible for re-election who has not attended at least one-fourth of the Committee Meetings during his year of office. That the office of President, or that of Vice-President, shall not be held by the same person for more than two years in succession.

VI.

The Committee may from year to year appoint a Sectional Committee as may be considered desirable to further original investigations in any one or more departments of the Club's work. Each Sectional Committee to be composed of six Members of the Club, not less than two being Members of the Club's Committee. No financial responsibility to be incurred by the Sub-Committee or any Officer of the Club without the previous approval of the Club's Committee. Any Sectional Committee may elect its own Chairman and Secretary from its Members.

VII.

That the Members of the Club shall hold at least Six Field Meetings during the year, in the most interesting localities, for investigating the Natural History and Archæology of Ireland. That the place of meeting be fixed by the Committee, and that five days' notice of each Excursion be communicated to Members by the Secretaries.

VIII.

That Meetings be held Fortnightly or Monthly, at the discretion of the Committee, for the purpose of reading papers; such papers, as far as possible, to be original and to treat of the Natural History and Archæology of the district. These Meetings to be held during the months from November to April inclusive.

IX.

That the Committee shall, if they find it advisable, offer for competition Prizes for the best collections of scientific objects of the district; and the Committee may order the purchase of maps, or other scientific apparatus, and may carry on geological and

archæological searches or excavations, if deemed advisable, provided that the entire amount expended under this rule does not exceed the sum of £10 in any one year.

X.

That the Annual Meeting be held during the month of April, when the Report of the Committee for the past year, and the Treasurer's Financial Statement shall be presented, the Committee and Officers elected, Bye-laws made and altered, and any proposed alteration in the general laws, of which a fortnight's notice shall have been given, in writing, to the Secretary or Secretaries, considered and decided upon. The Secretaries to give the Members due notice of each intended alteration.

XI.

Members of other Irish Field Clubs, residing temporarily or permanently in or near Belfast, may be enrolled Members of the Club without election or entrance fee on production of a voucher of membership of another Club, and without subscription for the current year on production of a receipt showing that such subscription has been paid to another Club. Failing the production of such receipt, the usual subscription for the current year to be paid to the Treasurer on enrolment. The names of Members so admitted to the Club to be published with the notice of meeting following the date of their enrolment.

XII.

That, on the written requisition of twenty-five Members, delivered to the Secretaries, an Extraordinary General Meeting may be called, to consider and decide upon the subject mentioned in such written requisition.

XIII.

That the Committee may be empowered to exchange publications and reports, and to extend the privilege of attending the Meetings and Excursions of the Belfast Naturalists' Field Club to Members of kindred societies, on similar privileges being accorded to its Members by such other societies.

RULES FOR THE CONDUCTING OF EXCURSIONS.

I. The excursion to be open to all Members, each one to have the privilege of introducing two friends.

II. A Chairman to be elected as at ordinary meetings.

III. One of the Secretaries to act as Conductor, or, in the absence of both, a member to be elected for that purpose.

IV. No change to be made in the programme, or extra expense incurred, except by the consent of the majority of the Members present.

V. No fees, gratuities, or other expenses to be paid except through the Conductor.

VI. Every Member or Visitor to have the accommodation assigned by the Conductor. Where accommodation is limited, consideration will be given to priority of application.

VII. Accommodation cannot be promised unless tickets are obtained before the time mentioned in the special circular.

VIII. Those who attend an excursion without previous notice will be liable to extra charge, if extra cost be incurred thereby.

IX. No intoxicating liquors to be provided at the expense of the Club.



Exchanges of Proceedings.

Aberdeen Working-men's Natural History and Scientific Society.
Transactions, No. 1.

Barrow Naturalists' Field Club.
Annual Report and Proceedings, Vol. XVI.

Bath Natural History and Antiquarian Field Club.
Proceedings, Vol. X., Part 2.

Belfast—Natural History and Philosophical Society.
Report of Proceedings, 1902 and 1903.

„ Ulster Journal of Archæology.
Vol. X., Part 1.

Berlin—Helio Abhandlungen und Mitteilungen, 1903.

Berwickshire Naturalists' Club.
Proceedings, Vol. XVIII., Part 1.

Brighton Natural History and Philosophical Society.
Annual Report and Abstracts of Papers, 1902 and 1903.

Bristol Naturalists' Society.
Proceedings, Vol. IX., Part 2, 1899.

Bulletin, Society Linneinne, Nos. 323 to 342.

Cardiff Naturalists' Society.
Report of Transactions, Vols. XXXIV. and XXXV.

Dublin—Royal Irish Academy.
Transactions, Vol. XXXII., Parts 2, 3, and 4.
Proceedings, Vol. IV., No. 5, Vol. V., Nos. 1 and 2.

„ Royal Society of Antiquaries of Ireland.
Journal, Vol. XXXIII., Parts 2, 3, and 4.

Edinburgh—Botanical Society.
Transactions and Proceedings, Vol. XXXI., Parts 1, 2, and 3.

„ Geological Society.
Transactions, Vol. VIII., Part 2 and special part.

Frankfort—Bericht der Senckinbergischen Naturforschenden. Gesellschaft, 1903.

Glasgow Natural History Society (207 Bath Street).
Report and Proceedings, 1899 and 1900.

„ Philosophical Society.
Proceedings, Vol. XXXIV., 1902-3.

Hamilton Association.
Journal and Proceedings, 1899 and 1900.

Hertfordshire Natural History and Field Club.
Transactions, Vol. XI., Parts 7, 8, and 9.

Hull Scientific and Field Naturalists' Club.
Transactions, 1902 and 1903.

Leeds Philosophical and Literary Society.
79th Annual Report, 1899.

Liverpool Geological Society.
Proceedings, Vol. VIII., Part 4.

London—British Association for the Advancement of Science.
Report of the Belfast Meeting, 1902.

„ British Museum Publications.
Handbook of Instructions for Collectors, Coral Guide.
"Southern Cross" Report.

„ Geologists' Association.
Proceedings, Vol. IX., Part 3.

Manchester Field Naturalists' and Archæologists' Society.
Report and Proceedings, 1899 and 1900.

„ Microscopical Society.
Transactions and Annual Report, 1902.

Mexico—Bulletin of Institute of Geology, No. 16.

Montevideo—Museo Nacional.
Annals, Vol. IV., Parts 1 and 2.

Norfolk and Norwich Naturalists' Society.
Transactions, Vol. VI., Part 4.

Nova Scotian Institute of Science, St. John's, Nova Scotia.
Proceedings and Transactions, 1900 and 1901.

Ottawa Literary and Scientific Society.
Transactions No. 1, 1899 and 1900.

Penzance Natural History and Antiquarian Society.
Report, 1897-98.

Peru—Boletin del Cuerpo de Ingenieros de Minas, No. 3.

Saint John's—New Brunswick Natural History Society.
Transactions, Vol. V., Part 1.

San Jose—Museo Nacional de Costa Rica.
Informe, 1897-98 and 1898-99.

Stavanger Museum.
Aarstberetning fur 1902.

Toronto—Canadian Institute.
Transactions, Vol. VII., Parts 1 and 2.
Proceedings, Vol. II., Part 3.

U.S.A.—Boston Society of Natural History.
Vol. XXX. Parts 3, 4, 5, 6, and 7. Vol. XXXI., Part 1.

„ Brooklyn—Institute of Arts and Science.
Cold Spring Harbour, Monographs Nos. 1 and 2.

„ Chapel Hill N.C.—Elisha Mitchell Scientific Society.
Journal, Vol. XIX., Parts 1 and 2.

„ Chicago—Academy of Sciences.
Bulletin, IV.

„ Madison Academy of Science, Art, and Letters.
Transactions, Vol. XI., 1896-97.

„ Milwaukie—Public Museum.
Annual Report, 1897-98.

„ Missouri Botanical Gardens, St. Louis, Mo.
11th Annual Report.

„ New York—Academy of Sciences.
Annals of, Vol. XIV., Parts 1, 2, and 3. Vol. XV., Part 1.

„ „ American Museum of Natural History.
Annual Report, 1902.
Bulletin, Vol. XVI.

U.S.A.—Philadelphia—Academy of Natural Sciences.
Proceedings, 1901-02, 1903.

„ Rochester Academy of Science.
Proceedings, 1901-02, 1903.

„ Salem—American Association for the Advancement of Science.
Proceedings of 49th Meeting, New York, 1900.

„ „ Essex Institute.
Bulletin, Vol. XXVIII., Nos. 7-12. Vol. XXIX., Nos. 7-12. Vol. XXX., Nos. 1-12.

„ Staten Island Natural Science Association.
Proceedings, Vol. VIII., Part 24. Vol. IX., Part 1.

„ St. Louis—Academy of Sciences.
Transactions. Vol. IX., Nos. 6, 8, and 9. Vol. X., Nos. 1—8.

„ Tufts College, Mass.
Studies, No. 6.

„ Washington—American Microscopical Journal.
12 parts.

„ „ Government Printing Offices.
Detached Papers by various Authors (13).

„ „ Smithsonian Institute.
Annual Reports, 1900, 1901.

„ „ United States Geological Survey.
22nd Annual Report, Parts 1, 2, and 4.
23rd Annual Report, Part 1.

., Wisconsin Geological and Natural History Survey.
Bulletins, Nos. 8, 9, and 10.

List of Members.

Any Change in the Address of Members should be at once notified to the Secretaries by Post Card.

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Holden, J. S., M.D., Sudbury, Suffolk.

Life Member.

Ewart, Sir W. Q., Bart., Glenmachan, Strandtown.

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Patterson, W. H. F., Stalheim, Knock.
Paul, Thomas, Redcot, Knock.
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Pim, W. R., Lisnagarvey, Lisburn.
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Porter, William, Beechview, Balmoral Avenue.
Praeger, E. A., Cultra, Holywood.
Praeger, R. Ll. B.E., B.A., M.R.I.A., National Library, Kildare Street, Dublin.
Prout, E., Fountain Lane.

Quail, Rev. Patrick, P.P., Dunmore, Ballynahinch.

Rankin, Will, Gordonall, Myrtlefield Park.
Redmond, David, Antrim.
Reilly, Geo. E., Woodburn, Carrickfergus.
Reilly, Alex. M., Woodburn, Carrickfergus.
Reilly, J. D., Woodburn, Carrickfergus.
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Shaw, Wm. Hinde, Brooklyn, Knock.
Shaw, Launcelot, Brooklyn, Knock.
Shaw, Mrs., Brooklyn, Knock.
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Stephens, Samuel, 13 Donegall Square North.
Stevenson, John, Coolavin, Malone Road.
Stewart, Rev. J. A., Killowen, Lisburn.
Stewart, S. A., A.L.S., F.B.S.E., The Museum, Belfast.
Stewart, W. J., Ormeau Rd.
Strachan, J., 18 Botanic Avenue.
Swanston, Wm., F.G.S., Cliftonville Avenue.
Swanston, Mrs., Cliftonville Avenue.
Symington, Prof., M.D., F.R.S., Queen's College.

Tate, Alexander, C.E., Rantalard, Whitehouse.
Taylor, E. E., Garfield Chambers.
Thomas, S. G., Woodland Avenue.
Thompson, Ross W., Magheralave, Lisburn.
Thompson, Mrs. H., Annadale, Glenavy.
Thornton, Thomas, Queen's College.
Todd, Wm. A., 24 Victoria Street.
Todd, John, Clarinda, Fortwilliam Park.
Tomlinson, W. J. C., Northern Counties Railway, Belfast.
Traill, W. A., Bushmills.
Turtle, James G., Claremont, Strandtown.

Vinycomb, John, M.R.I.A., Holywood.
Vinycomb, Bernard, Holywood.

Waddell, Rev. C. H., M.A., D.D., The Vicarage, Saintfield.
Walker, Miss, Rugby Road.
Walkington, Miss, LL.D., Strandtown.
Walkington, T. R., Edenvale, Strandtown.
Walsh, Robert, Abbotsford, Malone Road.
Ward, F. E., 15 Wellington Street.
Wardell, Miss, St. Joseph's Terrace.
Waters, Thomas, c/o. Dunville & Co., Ltd.
Welch, Robert, 49 Lonsdale Street.
Wheeler, Mrs., Lennoxvale, Belfast.
Wheeler, Miss O., Lennoxvale, Belfast.
Whitla, Sir Wm., M.D., College Square North.
Whittaker, Miss F. H., Antrim House.
Williamson, James, Ashurst, Ashley Park.

Wilson, James, C.E., Oldforge, Dunmurry.
Wilson, James, Ballybundon, Killinchy.
Wilson, Alec. G., Belvoir Park.
Wilson, W. H., J.P., Belvoir Park.
Wilson, George, 9 Bedford St.
Wilson, J. B., Lorna, Donegall Park.
Wilson, Prof. Gregg, D.SC., M.R.I.A., Queen's College.
Wilson, Fergus S., 4 Avonmore Terrace.
Wise, B. D., C.E., Waterside, Greenisland.
Wolseley, Charles, Ballymena.
Woollcombe, Robert Ll., LL.D., M.R.I.A., 14 Waterloo Rd., Dublin.
Workman, Rev. R., M.A., Rubane, Kircubbin.
Workman, W. H., M.B.O.U., Lismore, Windsor Avenue.
Wright, Joseph, F.G.S., 4 Alfred Street.
Wright, Miss, 4 Alfred Street.
Wylie, William, Mountpleasant.

Young, Robert, J.P., C.E., Rathvarna, Chichester Park.



BELFAST NATURALISTS' FIELD CLUB.

FORTY-SECOND YEAR, 1904-05.

LIST OF OFFICERS.

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Hon. Secretaries:
NEVIN H. FOSTER, M.B.O.U., HILLSBOROUGH, CO. DOWN.
JAMES ORR, 17, GARFIELD STREET, BELFAST.

PRESENTED
4 APR. 1905

The following Publications of the Club can be had from the Librarian.

Seventh Annual Report—1869-70, containing Appendix I., List of the Irish Liassic Fossils,—Tate, 1 Plate 2/6
Eighth Annual Report—1870-71, containing Appendix II., List of Irish Liassic Foraminifera—Wright; and List of the Fossils of the Estuarine Clays of Antrim and Down,—Stewart ... 2/6
Ninth Annual Report—1871-72 1/-
Tenth do. 1872-73 1/-
Proceedings—Series II., Vol. I,, Part I., 1873-4. containing Appendix III., List of Mosses of North-East of Ireland—Stewart; and List of Cretaceous Microzoa of North of Ireland,—Wright, 2 Plates 2/6
,, Series II., Vol. I., Part II., 1874-75 1/-
,, ,, ,, III., 1875-76 1/-
,, ,, ,, IV., 1876 77, containing Appendix IV., Recent Foraminifera of Down and Antrim,—Wright, 1 Plate; and Silurian Rocks of County Down—Swanston and Lapworth, 3 Plates 2/6
,, Series II., Vol. I., Parts V. and VI., 1877-78 and '78-'79 (in one) 1/-
,, ,, ,, Part VII., 1879-80, containing Appendix V.
,, List of Post-tertiary Foraminifera of North-East of Ireland—Wright; and List of Mollusca of Boulder Clay of North-East of Ireland,—Stewart 2/-
,, Series., II., Vol. II., Part I., 1880-81, containing Appendix VI., List of Foraminifera of South Donegal,—Wright; Sponge Remains from Carb. Limestone, County Sligo,—Wright; and Fossil Sponge-spicules, County Sligo,—Carter, 1 Plate ... 1/6
,, Series II., Vol. II., Part II., 1881-82 1/-
,, ,, ,, III., 1882-83 containing Appendix VII., Supplemental List of Mosses of the North-East of Ireland,—Stewart 1/-
,, Series II., Vol. II., Part IV., 1883-84, containing Appendix VIII., Notes on Irish Coleoptera,—Haliday; Cromlechs of Antrim and Down,—Gray, 12 Plates; and Pre-historic Monuments near Sligo,—Elcock, 4 Plates 3/-
,, Series II., Vol. II., Part V., 1884-85, containing Appendix IX., Ostracoda of Belfast Lough,—Malcomson; Fungi of North of Ireland,—Lett; Foraminifera of "Protector" Cruise, &c.—Wright; Cretaceous Foraminifera of Keady Hill,—Wright; Irish Coleoptera,—Patterson 3/-
,, Series II., Vol., II., Part VI., 1885-86, containing Appendix X., The Ferns of Ulster,—Phillips and Praeger 2/-
,, Series II., Vol. II., Part VII., 1886-87, containing Appendix II., Notes on the Sections exposed at the Alexandra Dock, Belfast, with List of Fossils, 1 Plate,—Praeger 2/-
,, Series II., Vol. III., Part I., 1887-88, containing Appendix III., Marine Shells of the North of Ireland,—Praeger 2/-
,, Series II., Vol. III., Part II., 1888-89 1/-
,, ,, ,, III., 1889-90, containing Report of
,, Larne Gravels Committee, 2 Plates 2/-
,, Series II., Vol. III., Part IV., 1890-91 1/-
,, ,, V., 1891-92 1/-
,, ,, VI., 1892-93 2/-
,, Index 6d.
,, Series II., Vol. IV., Part I., 1893-94, containing Appendix IV. 2/-
,, ,, ,, II., 1894-95, ,, ,, V. 2/-
,, ,, ,, III., 1895-96, ,, ,, VI. 2/-
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,, ,, ,, VI., 1898-99, ,, ,, ... 1/-
,, ,, ,, VII., 1899-1900, 1900-01, in one ... 2/-
,, ,, Vol. V., Parts I. & II., 1901-02, 1902-03 ,, ... 2/-
,, ,, ,, Part III., 1903-04 1/-

Annual Report & Proceedings.



SERIES II. PART IV.

VOLUME V. 1904-05.

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The Patterson Museum, People's Palace, Belfast.

ANNUAL REPORT AND PROCEEDINGS

OF THE

BELFAST NATURALISTS' FIELD CLUB

For the Year ending 31st March, 1905.

(FORTY-SECOND YEAR.)

SERIES II. PART IV.

VOLUME V. 1904-05.

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1905.

BELFAST NATURALISTS' FIELD CLUB.

FORTY-SECOND YEAR, 1904-05.

LIST OF OFFICERS.

President:
W J. FENNELL, M.R.I.A.

Vice-President:
ROBERT PATTERSON, F.Z.S., M.R.I.A., M.B.O.U.

Treasurer:
W. H. PHILLIPS,
LEMONFIELD, HOLYWOOD,
CO. DOWN.

Librarian:
GEORGE DONALDSON,
8, MILERIVER STREET.

Committee:

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W. A. GREEN.
ALEX. MILLIGAN.
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GEORGE E. REILLY.
ROBERT WELCH, M.R.I.A.
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JOSEPH WRIGHT, F.G.S.

Hon. Secretaries:
NEVIN H. FOSTER, M.B.O.U., HILLSBOROUGH, CO. DOWN.
JAMES ORR, 17, GARFIELD STREET, BELFAST.

Annual Report.

Your Committee beg to submit their forty-second Annual Report, and have again to record increase in the Club's membership. Seventy new members have been elected during the year, of whom 3, not yet having paid entrance fee and first year's subscription, have not been entered on roll, and 25 names have been deleted through death, resignation, or other cause.

During the year your Committee held 10 meetings, at which the average attendance was 11·3 out of a possible 16.

The Summer Excursion Programme, arranged at the commencement of the Session, was fully carried out, the places visited and dates of excursions being as follows:—

Hillsborough (Half-day)	21st May.
Boyne Valley	11th June
Fair Head	1st July.
Sligo (with Irish Field Club Union)	12th till 19th July.
Roughfort and Templepatrick (Half-day) ..	30th July.
Ballyhornan Bay	13th August.
Helen's Tower (Half-day)	3rd September.

The attendance at these field meetings was very large, the Hillsborough excursion proving a record in point of numbers—no fewer than 167 members and friends taking part therein. During the session 144 members participated in the excursions, of which number 67 attended only one, 27 attended 2, 26 attended 3, 12 attended 4, 6 attended 5, 5 attended 6, while only one member was present at all the excursions.

In connection with the Summer Programme your Committee have to record their indebtedness to the Dowager Marchioness of Dufferin, the Marquis of Downshire, and Captain Chichester, who granted permission to visit their grounds, and to Mr. and Mrs. Fennell and Mr. and Mrs. Foster for their hospitality on the occasions of the Club's visits to Ballycastle and Hillsborough.

The Winter Session was opened with a Conversazione in the Exhibition Hall, when upwards of 400 members and

friends were present, and at which the traditional high degree of excellence of the members' exhibits was well sustained. The regular Winter Meetings held in the Museum were as follows:—

1904.

15th Nov. "Report as Delegate to Meeting of Corresponding Societies, British Association." Mr. W. J. Fennell, M.R.I.A.I.

Presidential Address—"Notes on the Sligo Excursion." Mr. W. J. Fennell, M.R.I.A.I.

20th Dec. "A Talk about Moths." Rev. George Foster.

"The Feathered World." Mr. N. H. Foster, M.B.O.U.

1905.

17th Jan. "Plant Structure and Environment." Dr. G. H. Pethybridge, B.Sc. (I.F.C.U. Delegate from D.N.F.C.).

21st Feb. "Observations on our Home Hills." Mr. Robert Bell.

"Origin and Growth of Agate and Chalcedony." Mr. J. Strachan.

21st Mar. "Forests, Wild and Cultivated." Mr. Augustine Henry, M.A., F.L.S., L.R.C.P. (Ed.).

11th April "Perforations in Primary Limestone from North Donegal." Mr. Joseph Wright, F.G.S.

"Folk-lore." Mr. E. J. M'Kean, B.A., B.L.

General Annual Meeting.

These meetings were all well attended, and the papers read (of which abstracts will be found in the Proceedings) proved of high merit. As the informal Wednesday Evening Meetings in the Club-room were sparsely attended by members, the Committee decided that during the months of February and March a special subject should be announced for each evening, and the following subjects were brought before the meetings by the member of Committee appointed to take charge for the evening:—

25th Jan. "Evolution of Plant as compared with Animal Life." Mr. Alex. Milligan.

1st Feb. "Half an Hour in Canterbury." Mr. W. J. Fennell, M.R.I.A.I.

8th ,, "Preservation of Birds." Mr. W. A. Green.

15th ,, "Sea Anemones." Mr. W. H. Gallway.

22nd ,, "Sharks' Teeth from Local Cretaceous Formations." Mr. Robert Bell.

1st March "Carrickfergus Salt Beds." Mr. George E. Reilly.

8th ,, "Deep Sea Life." Prof. Gregg Wilson, D.Sc., M.R.I.A.

15th ,, "Eggs of Irish Breeding Birds." Mr. N. H. Foster, M.B.O.U.

22nd ,, "Marine Shells of our District." Mr. George Donaldson.

29th ,, "Geological Photographs, taken for the New Government Memoirs o the Dublin, Belfast, and Cork Areas." Mr. Robert Welch, M.R.I.A.

These informal meetings proved highly instructive, and it is to be hoped that they will be continued, and that many of the members will contribute short papers during the forthcoming Winter Session.

Honours conferred on four members of our Club have to be placed on record, viz., Mr. W. H. Phillips having been elected President of the British Pteridological Society, and Major Berry, Messrs. W. J. Fennell and Robert Welch having been elected members of the Royal Irish Academy.

Through the exertions of your Committee a grant from the Royal Bounty Fund was obtained for Mr. S. A. Stewart, A.L.S., which, with the subscriptions given by your members and by those of the Natural History and Philosophical Society, has enabled him to purchase an annuity.

The Patterson Museum in the People's Palace was organised and arranged by Mr. Robert Patterson with the assistance of a few members of the Club, and the result of their labours reflects great credit on those who assisted in this educational scheme.

Delegates from your Club attended the meeting of the Irish Field Club Union Committee in Dublin on 1st November.

Your Committee appointed Mr. W. A. Green as one of their representatives on the Council of the Ulster Fisheries and Biology Association.

The Treasurer will submit the Statement of Accounts, which shows a balance in hand of £15. 4s. 9d., all accounts having been paid up to the present. The Librarian's Report, the Reports of the Botanical and Geological Sections, and that of the Sub-Committee appointed to adjudicate on Collections submitted for prizes, will be presented.

In conclusion, your Committee desire to place on record their obligations to the Superintendents of the Railway Companies for facilities afforded on the different excursions, and to the Press for publishing reports of the various meetings. Our thanks are again due to the Public Bodies and Kindred Societies who have favoured us with their publications during the past year.

(Signed)

NEVIN H. FOSTER,
JAMES ORR, } *Hon. Secretaries.*

Report of Librarian:—

Our exchange of publications with Kindred Societies in Great Britain, United States of America, and the Continent has continued and enlarged during the past year; I had several applications from such Societies, who had not previously exchanged with us, for copies of our Proceedings, all of which I have complied with, and to some of which I have sent complete sets of our last four volumes, viz., Hull Public Library, North Staffordshire Naturalists' Field Club, New York Public Library, Milwaukee Public Museum (Wis.), Field Columbian Museum (Chicago), and Academy of Science (San Francisco), all of which tender their grateful thanks to the Committee for their kindness. We have received from the publishers of the "Irish Naturalist" a full set—thirteen volumes—of that publication, which have been bound, and are now in our book-case, available for the use of the members. I have also got bound the ten published volumes of the "Ulster Journal of Archæology"; and three volumes of our own Proceedings I have also had strongly bound, all of which make very handsome and, I hope, useful additions to our Library. In conclusion, I would strongly urge upon Members the necessity of their entering, in the book provided for that purpose, their own name, and the name and number of any book taken away for home reading; latterly some books have been applied for, which I find have been taken away and not entered, and there are one or two that have not been returned as yet, so I hope the members will return them as soon as possible.

(Signed)

Geo. Donaldson, *Librarian.*

Report of the Committee of Botanical Section:—

The Committee of the Botanical Section, in presenting their report for the Session of 1904-05, beg to say that they are satisfied that the Section maintains its normal healthful condition as a working department of the Club. With regard to the outdoor work of the Summer of 1904 we have to say that

the Saturday Afternoon Excursions, which for many years have been a feature of our work, were practically abandoned. This was due to several causes, of which we may mention the following:—The absence of members at the seaside and on holidays; and the fact that a number of our members preferred to combine botanical with geological work, and for that purpose joined in many of the Geological Section's excursions. This, on the whole, we regard as satisfactory—indicating, as it does, an extension of interest in scientific study; whilst we are satisfied that the botanical features of the localities visited on these occasions were duly observed by our members. In fact we incline to think that regular and frequent excursions of the Sections combined would benefit both very much.

From amongst the results of the outdoor work of the Section which have been brought under our notice we select the few following as being the most interesting. In August, 1904, the British Pteridological Society determined, with regard to a variety of a species of fern known as *Blechnum Spicant*, which had been collected by Mr. William Porter on Monk's Hill, West of Ligoniel, that it was a variety of the fern not previously known, and accordingly named it *B. Spicant* var. *tricapitatum* (Porter). Of not less interest to Ulster botanists was the finding of the yellow bird's-nest, *Hypopithys multiflora*, by Mr. N. Carrothers, in the demesne of Ely Lodge, on the shores of Lower Lough Erne, in July last. This plant had been, till then, unknown in the flora of Ulster, and is very sparingly distributed throughout the rest of Ireland. Mr. Carrothers has been also doing valuable work in the observation of alien plants and casuals in this district.

Amongst other items may be mentioned the finding of *Geranium pyrenaicum* once more at Conlig by Mr. S. A. Moore. We think this may now be regarded as a permanent station for this plant, notwithstanding the opinion of some high authorities that it continues to grow only where the soil overlies the limestone.

In May last Mr. H. C. Marshall found *Polypodium vulgare* var. *semilacerum* at the Deer Park, Cave Hill. This is a new

station for this somewhat rare variety, Woodburn and Knockagh being hitherto the nearest reported stations for it. In the month of July, whilst the last-named gentleman and myself were botanising in the Cotton Moss, between Ballygrainey and Donaghadee, we were fortunate in finding a small colony of wild rosemary, *Andromeda Polifolia*, a plant which had not been seen in the neighbourhood for something like forty years, although frequently searched for. In the "Flora of the North-East" Mr. Stewart says that this plant is very rare, and likely soon to become extinct in the district. Mr. Richard Hanna, who has always taken a deep interest in the genus *Carex*, reports having found *C. muricata* and *C. teretiuscula* in a number of new stations, and thinks it probable that these two species, which up till recently were considered very rare, have probably been overlooked in many places.

During the Winter the Section met once a month in the Club-room. Rev. C. H. Waddell lectured at three of these meetings; Mr. C. J. Lilley, D.I., Larne, and Mr. Wm. Gray also lectured at other meetings during the Winter.

The Winter programme was as follows:—

Nov. 19. Rev. C. H. Waddell, B.D., exhibited and described a series of Plants collected by him in the South of England during the Summer.

Dec. 17. Mr. Wm. Gray, M.R.I.A., exhibited and explained a very fine collection of Microscopic Slides illustrative of Plant Tissues and Organs.

Jan. 21. Mr. C. J. Lilley, D.I., exhibited and spoke on a large collection of Alien Plants made at Ballyrudder, Co. Antrim. The Rev. C. H. Waddell afterwards delivered a short lecture on "Twigs."

Feb. 18. The Rev. C. H. Waddell continued his address on same topic.

Mar. 18. Informal review of work done since last Annual Meeting, and short discussion on Proposed Excursions for present year.

(Signed)

ALEX. MILLIGAN, *Hon. Secretary of Section.*

Report of Geological Section:—

The Geological Section has to report a year of steady progress; a great amount of interest is taken by the members in the work of the Section, and it is with pleasure we note the appearance of many new faces amongst those who attend the meetings. Several excursions were held during the year and

were well attended. Among the localities visited were—Squire's Hill, Whitehead, Conlig, and Hillsport.

During the Winter many of the members availed themselves of the fine course of lectures on Geology given by Mr. G. C. Gough, F.G.S., in the Queen's College. At a meeting of the Section held on 2nd November the members had an opportunity of examining a splendid series of Dolomitic Concretions kindly lent by Mr. G. Abbott, F.G.S., of Tunbridge Wells. Mr. Gough gave a talk on "Concretions," and explained the various theories as to their origin. On January 4th Mr. James Strachan read a paper on "Some forms of Silica," illustrated by specimens, diagrams, and chemical experiments. The lecture was well attended, and was very instructive. The members also benefited from several papers on geological subjects read at the Wednesday Evening Meetings, and at the ordinary Monthly Meetings of the Club.

One of our members, Mr. Robert Bell, discovered during the year teeth, plates, and spines of a Liassic Sea Urchin (*Pseudodiadema lobatum*—Wright), hitherto unrecorded from Ireland. Another member, Mr. Wm. Christy, while geologising in Colin Glen, found in the Greensand a scute of a crocodile probably belonging to the genus *Goniopholis*, which is also a new record. At the Whitehead excursion Mr. G. C. Gough collected samples of Chloritic and Yellow Sands, from which he was afterwards able to identify several species of foraminifera. Until Mr. Gough's discovery foraminifera were only known to occur in the Irish Greensand in the form of unrecognisable casts.

The Committee invite all members of the Club who take an interest in Geology to join the Section, and help by their co-operation to make our meetings more instructive and our work more useful.

(Signed)

James Orr, *Hon. Secretary of Section.*

Report of Sub-Committee on Prize Competitions:—

Prize No. 5.—Two collections were submitted in competition for this prize, a set of Cretaceous fossils by Mr. William Christy, and a set of Liassic by Mr. Robert Bell. We award the prize to Mr. Christy for his very excellent collection, which is neatly mounted, and named; but Mr. Bell's collection is also so exceedingly good, containing as it does some of our rarest species, that we recommend a special prize to Mr. Bell.

Prize No. 6.—Mr. W. J. C. Tomlinson's set of Ulster rocks admirably fulfils the conditions set forth in the list. The collection consists of 30 specimens, and comprises Igneous, Sedimentary, and Metamorphic Rocks, carefully trimmed and labelled, and localities noted. Accompanying the specimens is a carefully written report giving detailed information as to the use to which the rocks have been put in the respective localities. Prize No. 6 is therefore awarded to Mr. Tomlinson.

Prize No. 11.—Mr. G. C. Gough selected for this subject Foraminifera, and has sent in a series of 24 slides of species collected in Larne Lough. They are neatly mounted and carefully named, and we award this Prize to Mr. Gough.

We wish to direct attention to the paucity of competition for the Club Prizes, four entries for 18 prizes seem a very small number in a Club membership of 400.

(Signed)

Samuel A. Stewart,
Robert Welch,
Robert Patterson.





S. A. Stewart, A.L.S., F.B.S.Edin.

ADDRESS TO SAMUEL ALEXANDER STEWART, A.L.S., F.B.S.Edin.,

Curator of the Collections in the Belfast Museum, and Hon. Assoc. Belfast Nat. Hist. and Phil. Soc.

Dear Mr. Stewart,

We, the President and Members of the Natural History and Philosophical Society and the President and Members of the Belfast Naturalists' Field Club, desire to place on record the high sense of satisfaction with which we have learned that you have been elected an Associate of the Linnean Society as a recognition of your long and valuable services in botanical research, and we desire to congratulate you most heartily on it. And we trust that you may be long spared to wear your well-won honours and to pursue the studies that have brought you such distinction.

We also request that you will accept this Purse of Sovereigns as a slight token of our friendship and esteem.

We are, dear sir, yours sincerely,

(Signed)

Johnson Symington, *President N.H. and P.S.*
Robert M. Young, *Hon. Sec. N.H. and P.S.*
W. J. Fennell, *President B.N.F.C.*
Robert Patterson, Nevin H. Foster, } *Hon. Secs. B.N.F.C.*

Belfast, 26*th April*, 1904.

MR. STEWART'S REPLY.

Mr. Chairman, Ladies and Gentlemen,

It is with feelings of the utmost gratification that I receive this complimentary address, and accompanying valuable gift. My sense of its value is heightened by the fact that it comes from the Officers and Members of the two Societies that cultivate Natural Science in Belfast and the North of Ireland; also the occasion that you have taken adds very much to the

value of your presentation. It was a red-letter day with me when I was elected as an Associate of the Linnean Society. That the premier Natural History Association of this country should, without any solicitation on my part, have conferred on me this distinction came as a surprise, and I may say that of all the honours possible to me this is the most prized. The climax comes when the Naturalists, with whom I have worked so long, accord me the present token of their approbation.

I feel that now my work, to a great extent, has been done. Tate, Robinson, and many others who helped it forward, and who were instrumental in establishing our Field Club have gone. They have followed Drummond, Patterson, Templeton, Thompson, and the many old-time worthies of the Natural History Society. The Associations which they founded and supported remain, and I rejoice to see indications that new workers have come and are coming forward. I wish them every success, and hope that in Nature studies they will enjoy the same pleasure that rewarded me.

I beg to thank you all for this manifestation of your kindness.

(Signed)

S. A. Stewart.

STATEMENT OF INCOME AND EXPENDITURE for the Year 1st April, 1904, till 31st March, 1905.

Dr. **Cr.**

To Balance from last year			£42	0	6	By Printing, Stationery, and Advertising—					
,, Subscriptions			98	15	0	,, Half-tone Blocks	£5	18	0		
,, Entrance Fees			17	10	0	,, Advertising	5	8	3		
,, Receipts—Conversazione			21	3	0	,, Printing and Stationery	9	17	0		
,, Publications sold			0	8	6	,, Typewriting	2	14	3		
,, Balance from Excursions			0	15	1	,, Printing Report, 1902-3	27	0	9		
						,, ,, ,, 1903-4	25	0	0		
									75	18	3
						,, Expenses of Conversazione			19	17	11
						,, Rent of Museum			18	0	0
						,, Commission to Collector...			4	6	0
						,, Donation to *Irish Naturalist*			2	0	0
						,, ,, Irish Field Club Union ...			2	2	0
						,, Expenses of Lectures			4	11	0
						,, Postages			32	6	1
						,, Gas, 17/9. Insurance, 10/-			1	7	9
						,, Prize, £1. Sundries, 1/1			1	1	1
						,, Bookbinding			2	19	6
						,, Books for Library			0	17	9
						,, Balance in hands			15	4	9
			£180	12	1				£180	12	1

(Signed) W. H. PHILLIPS, *Hon. Treasurer.*

Proceedings.

SUMMER SESSION.

HILLSBOROUGH.

(Half-day Excursion.)

The first excursion of the Summer Session took place on the 21st May, when a very large party of members and friends assembled at the Great Northern Railway Terminus and took seats in the carriages reserved for their accommodation by Mr. C. Wallace, the courteous superintendent of the Northern portion of the line. The clouds looked threatening, but the faith of the members in the proverbial "Field Club weather" was strong, and, although the afternoon did not prove sunshiny, the rain held off, and umbrellas and waterproofs proved *de trop*. On arrival at Hillsborough Station, the company was augmented by some local members and by several who had preferred cycling from Belfast, when it was evident that this excursion had created a record in point of numbers, there being upwards of one hundred and sixty-seven present.

By kind permission of Mr. Anthony F. Maude, agent to the Marquis of Downshire, admittance to the demesne had been accorded, and, escorted by Mr. Bradshaw and the Honorary Secretary, Mr. Nevin H. Foster, the members proceeded to explore the manifold beauties this place affords. To those who, as a rule, only view bricks and mortar and the stunted vegetation of a city, this charming spot proved a delightful variety; the fresh green of the trees just bursting into leaf, the masses of blue hyacinths, purple orchis, wood anemones, and wood sorrel, with many other kinds of wild

flowers now in full bloom, interspersed with ferns of various species unfolding their fronds, called forth exclamations of pleasure as the party pursued its way through the well-tended grounds. On arrival at the lake, a swan sitting on her nest was pointed out, and a cygnet not long emerged from its shell was observed swimming about in charge of its male parent; while dotted over the water were to be seen mallards, coots, moorhens, and little grebes. But the scene which elicited most numerous expressions of admiration was the collection of conifers growing by the upper end of the lake; here are many varieties of pines and cypresses of varied form and hue, some standing stiff, and looking as if subjected to a clipping process, others with gracefully decumbent branches, in places stretching out over the water, and all affording typical nesting sites and feeding places for the numerous great, blue, and coal tits, redpolls, golden-crested wrens, and siskins which flew about from tree to tree, and enlivened the scene with their melodious warblings. Among these trees may be mentioned—*Pinus insignis*, *Pinus pinsappo*, *Abies Douglassi*, *Abies Albertiana*, *Abies deodara alba*, *Cupressus erecta viridis*, *Thuga gigantea*, *Libocedrus decurrens*, and *Wellingtonia gigantea*, with many other species, all displaying a perfection of form which, as well as the condition of the grounds and gardens, reflects great credit upon the care and attention bestowed on them by Mr. Bradshaw, whose name as a cultivator is a household word with those who attend the horticultural shows of Dublin and Belfast. Ever and anon, on turning a corner in the paths, our eyes were almost dazzled by the blaze of colour from the masses of rhododendrons, for which the soil here, being destitute of lime, is specially adapted, the luxuriance of their flowers and foliage testifying to their well-known calcifuge propensities.

The ruins of "Old Cromlyn Church" were next visited, and diverse opinions expressed in respect of their antiquity, some affirming that they were the remains of a pre-reformation church, while others regarded them as of much more recent erection. However, there can be no doubt that an

old cemetery existed here, as from time to time quantities of human bones have been exhumed in close proximity to the "ruins." But the time at our disposal here having now expired, our conductor's whistle summoned us to leave (with regret) the demesne, and, crossing over the old mail coach road from Belfast to Dublin, we entered the large park, and proceeded by the side of the lake, a haunt of the great crested grebe and many other sorts of water-frequenting birds, to the old castle. This castle was made a Royal fortress by Charles II. in 1660, who appointed Arthur Hill and his heirs hereditary constables, with twenty-four wardens under their command. Two of these wardens, dressed in the quaint costume of William III.'s Dutch Guards, were in attendance, and their picturesque dress and accoutrements were examined with interest by the members; an English member, eager to gain information, on anxiously inquiring what they were and where did they come from, being gravely assured that these were the identical individuals left here by King William after his sojourn in the castle in 1690. Here it was that this monarch signed two very remarkable, though widely differing, documents, the grant of Regium Donum to Presbyterian ministers, and the yearly grant of King's plate and incorporation of the Royal Down Corporation of Horse Breeders. The castle is a square building with corner turrets, and stands in the middle of the west side of a large square enclosure with high ramparts, and having a bastion at each angle, thus forming a redoubt. On the north side is a small tower or barbican with an arch which was formerly the principal entrance. It was surrounded by a moat, and in the days of primitive firearms must have been a place of considerable security. In front of the castle the members were grouped and photographed by Mr. A. R. Hogg, and this picture, which includes the two "Castle Guards," should prove an interesting souvenir to those who took part in this excursion. Our conductor again sounded his whistle, and we were led to the Corporation Arms Hotel, where all present were most kindly entertained to tea by Mr. and Mrs. Nevin H. Foster. After



Hillsborough Old Castle.

[Photo. by Dr. H. J. Boyd

the wants of the huge party had been attended to, a short business meeting was held, when, on the motion of the President, Mr. W. J. Fennell, M.R.I.A.I., cordial votes of thanks were passed to Mr. Maude, to whom the members were indebted for obtaining Lord Downshire's permission to view his grounds; to Mr. Bradshaw, who escorted the party; and to Mr. and Mrs. N. H. Foster for their hospitality. The election of Mrs. Stephens, Miss Stephens, Mrs. Courvoisier, Miss Courvoisier, Mrs. W. C. Dobbin, Miss May Maguire, Messrs. Wm. Gaffikin, Charles Roy, S. H. Douey, James Steel, G. S. Kirker, and W. T. Braithwaite to membership brought the business meeting to a close, after which the members proceeded to visit the parish church, an elegant structure erected in 1773, on the site of an older building erected in 1662, and consisting of a nave and cross aisles, with a tower upwards of 100 feet high, surmounted by a steeple of 110 feet more, and forming a well-proportioned object visible at a great distance. It contains a very fine peal of eight bells, and in connection with them is an old carillon which plays tunes upon the bells at the hours of 4, 8, and 12.

The district is rich in bird life, and several of the rarer Irish breeding species regularly nest in the vicinity. Among these may be mentioned the dipper, the siskin, the twite, the kingfisher, the stock-dove, and the great crested grebe. The thirteenth recorded specimen from Ireland of that Arctic bird, the rough-legged buzzard, was taken about a mile from the village in November last. A member handed in a list of 27 species of birds which he had observed during the afternoon. On the way to the old castle the members were disgusted at the blot on the fair landscape made by the keepers' "museum." Hanging on a tree, in various stages of putrification, were half a dozen owls and the same number of kestrels, along with sparrow-hawks and stoats. Merely from the low standpoint of game preservation little objection can be taken to the two latter, but how many years must elapse before ignorant gamekeepers learn that owls and kestrels are the best friends they have, and should be strictly protected?

It has been pointed out over and over again in various journals and newspapers that owls and kestrels live chiefly on rats and mice, and are most beneficial in clearing off enormous quantities of these pests. Rats will destroy all the eggs they can get at, therefore keepers should, in their employers' interests, preserve owls and kestrels as the deadly enemies of rats; but ignorance and prejudice are hard to overcome, and so the innocent suffer for the guilty. To add to their feelings of disgust the members were shocked to observe that in most cases the legs of the victims showed clear evidence of a lingering and painful death by the odious pole-trap. Fortunately the Pole-trap Bill, which has recently passed through Parliament, will put an end to such barbarity in future, which was a disgrace to civilisation.

Some damp, mossy glades in the woods were searched for the smaller land-shells. Here the pretty little radiated snail, *hyalinia radiatula*, was found, with its rare pale-green variety; the close rays on the shell being clearly visible with a pocket lens. The lakes yielded abundance of one of the coil shells, *planorbis albus*, distinguished from the others by its fine concentric striations, among other differences. Rather fine specimens of the little *valvata cristata* were plentiful near the margins, with some large *pisidium fontinale*. Near the old castle the very local *limax flavus* lives in old trees. This bright-yellow slug is the common "larder thief" of the Dublin cellars, though it is so very local in the North-East. One of the tree snails, *balea*, was observed on old trees, but in small numbers. In the lakes the swan mussel, *anadonta cygnea*, is very plentiful, specimens measuring five inches in length being not uncommon.

From the standpoint of the botanist, the day was a most successful one. Although nothing new was found, yet the grand array of old friends gave satisfaction to every botanist. Soon after entering the demesne we passed by the lake, which was well adorned with flowers. The marsh-marigolds gave the banks a beautiful colour; while here and there amongst them the ladies'-mantle, bugle, and the common borage were

found growing. Also on the banks two species of *carex* were found in flower. In the water there was a very large quantity of *elodea* (the Canadian water-weed), together with *spirogyra*, one of the filamentous *algæ*. The ivy-leaved toadflax was growing plentifully on all the walls. It is a beautiful little plant, and though so very common yet it is a most interesting one. When in bloom, the stalk which carries the flower grows out towards the light, but as the fruit begins to form it responds to the stimulus of light in a different way, for it now bends round and finds its way into the dark crevices of the wall, thus burying its seeds. A few of the members were fortunate enough to find the adder's-tongue fern. They are to be complimented on finding this plant, especially seeing that it was growing side by side with the sorrel plant, the leaves of which are so similar to those of this fern. Two species of orchids were gathered, the tway-blade and the early purple orchis. Lousewort was also found to be growing very freely. This plant is parasitic, stealing food which has been collected by the roots of grasses, this it accomplishes by boring into their roots. The field woodrush and the broad-leaved hairy woodrush were also growing in the ground, and in the shaded portions the common wild arum was growing plentifully. The following plants were also found in flower:—beaked parsley, wood sanicle, greater stitchwort, barren strawberry, hairy bitter cress, heartsease, dog violet, bluebell, ground ivy, wood-sorrel, also the oak and sycamore. Many of the commoner species of ferns were observed growing luxuriantly, and of the more locally-distributed species were seen *asplenium Adiantum-nigrum* and *ophioglossum vulgatum*. The oak fern, *polypodium Dryopteris* is growing in the demesne, where it has probably been introduced; and a fine collection of varieties of the lady fern, *athyrium Filix-fœmina*, raised from spores, gave a subject for mutual interchange of opinions among the pteridologists.

One of the very interesting features of the day was the presence of Mr. Stewart, the old botanical chief of Ulster.

After leaving the church the members proceeded to the

station, entered their reserved carriages, and arrived in Belfast shortly after seven o'clock, delighted with the many features of interest afforded on this record-making excursion of the Club.

THE BOYNE VALLEY.



MUREDACH'S CROSS.
[*Photo. by W. J. Fennell.*

The second excursion of the Summer Session took place on Saturday, 11th June, the place selected being that interesting historic and prehistoric district — the Valley of the River Boyne. Notwithstanding the early hour (7-15) at which members had been instructed to assemble at the Great Northern Railway Terminus, Belfast, a large party turned out, and were conducted to the specially reserved carriages set apart for their accommodation, which, however, proved inadequate, and many of the members were forced to find seats in other parts of the 7-30 train. At Portadown, the first stopping-place for this train, the party was augmented by a contingent from Hillsborough, Lurgan, Moira, and Lisburn, which had proceeded thither by an earlier train, and at Drogheda, where some Dublin members joined, it was found that almost ninety members and friends had decided

on taking part in what must be regarded as one of the most enjoyable of the many successful excursions of the Belfast Naturalists' Field Club. Mr. A. R. Hogg had sent a large collection of photographs of the district to be visited, and during the journey the Secretary went from compartment to compartment and handed these round for members to inspect. The examination of these photographs gave great pleasure, and raised many discussions as to the ages of some of the antiquities pourtrayed or on the reasons why they had been constructed; those showing the interiors of the chambers of Dowth and Newgrange (taken by flashlight) being specially admired. On arrival at Drogheda a short time was allowed to permit some of the members to procure refreshments after their early start (some having been compelled to leave their homes as early as five o'clock), but at 10-15 all were seated on brakes and cars, and the procession of ten vehicles started from the station, and proceeded to the obelisk on the north or left bank of the River Boyne. Here time was allowed for members to make collections and to inspect the celebrated battle-ground, the positions taken up by the combatants on that July morning being pointed out. The obelisk, 150 feet high, is erected on the spot where it is supposed King William commenced the attack, having led his forces thither down the road still known as "King William's Road"; and it records the death of the famous General Schomberg, who, crossing the ford, was killed by a random shot of one of his own men.

While some of the members occupied themselves by contemplating and discussing these historical events, others wandered by the river bank searching for botanical or zoological treasures, and many interesting notes were made and specimens taken for further examination and study. But, as a large programme had been drawn up, time would not permit of a thorough investigation, and the whistle of the conductor summoned all to resume seats, no doubt to the regret of the botanists and zoologists but the archæologists wanted their innings, and from this point the excursion became mainly archæological, though of such a character that it could not fail

to fix the attention and excite the interest of the visitor, by whom such studies may never have been seriously considered. We commenced with the great underground structures of a long-vanished and forgotten race of men, whose rude memorials date possibly from some thousands of years before Christ, and which stamp their builders as being men full of energy and advancement. We passed from the monuments of this time to those of the cultured era of the early Church in Ireland, and completed our study for the day in the ruins of a church of the Normans, whose advent practically brought to a full stop the national art of Ireland, and introduced a more modern and coarser grade of decoration. A drive of little more than half an hour brought us to Dowth, our next stopping-place. Owing to the heavy rainfall of the previous day, the roads were quite free from dust, and even to the occupants of the last vehicle there was no unpleasant element to mar the prospect of the fertile valley, illuminated during the whole day by brilliant sunshine. The parish of Dowth contains a ruined church, St. Bernard's holy well, a castle attributed to Hugh de Lacy, and the seat of the extinct Viscounts Netterville, and a large rath or mound containing subterranean passages and chambers in which human and other bones were found when they were opened in 1847. The members proceeded to explore these underground passages, some of which open at the ground level, but to the main chamber access is gained by the descent of an iron ladder, and, an abundant supply of candles having been provided, the exploration presented no great hardships. Meanwhile the collectors were busy, and the photographers were employed in recording the various points of interest till it was time to resume seats for the drive to the "Royal Cemetery" of Newgrange, about two and a half miles west from Dowth. This is an artificial tumulus, covering about an acre of ground, and rising to a height of about fifty feet, of which Wakeman, writing in 1848, says:—"It would be vain to speculate on the age of a work situate on the Boyne which if found on the banks of the Nile would be styled a pyramid, and perhaps

considered the oldest of the pyramids of Egypt." This building contains a central domed chamber, with three minor chambers branching off it, and is reached by a passage about seventy feet long, the whole accidentally forming a cross on plan. In front of the entrance is lying a large stone covered with inscribed concentric circles, and, scrambling over this, the members found themselves in the narrow passage, which, however, presented no difficulties to persons of ordinary proportions, and they soon gained admittance to the main chamber. Here the President (Mr. W. J. Fennell, M.R.I.A.I.) drew attention to the great monolithic character of the dry masonry, the vaulted roof, and the rude attempts at decoration, chiefly incised, which had been worked on many of the stones, and which had been cut before the stones were placed in position. The chamber was then lighted up with coloured flares, and so good is the ventilation that these occasioned no inconvenience, and many of the members contrasted this with their experiences in the caves near Enniskillen, where the fumes had compelled them to beat a hasty retreat lest they should be suffocated. Many photographs were obtained, both of the exterior and interior, the magnesium ribbon being called into requisition for the latter.

An hour's drive from Newgrange brought us to the ruins of Mellifont Abbey, in course of which the luxuriance and profusion of fern life by the wayside was much admired and commented upon. The most common species appeared to be the soft shield fern (*Polystichum angulare*), and in company with it many fine specimens of the male fern (*Lastrea Filix-mas*), the broad buckler fern (*L. dilatata*), the lady fern (*Athyrium Filix-fœmina*), and its variety *rhæticum*, with countless numbers of hart's tongue ferns (*Scolopendrium vulgare*), many of which displayed the characteristics of the variety *undulatum*, and many luxuriant plants of the wood fern (*Polypodium vulgare*); while on the walls were the wall-rue (*Asplenium Ruta-muraria*), the maiden-hair spleenwort (*A. Trichomanes*), the black-stalked spleenwort (*A. Adiantum-nigrum*), and the scale fern (*Ceterach officinarum*). At Melli-

font Abbey the lunch baskets were requisitioned, and when sufficient time had been allowed for an appreciation of their contents we were called to learn from our President an account of the place, in course of which the architectural features were minutely pointed out and explained. We were informed that the abbey was founded in 1142 by Donough MacColvill, or Carrol, a prince of Uriel, and was the home of a colony of Cistercian monks, sent over by St. Bernard from Clairvaux. It was the first Cistercian abbey built in Ireland, and the mother-house of over forty branch abbeys. These abbeys were always built in secluded positions, usually on the banks of rivers; such situations contrasting strongly with the exposed positions selected by the church builders of earlier ages, from which extensive views of the surrounding country could always be obtained. At the conclusion of Mr. Fennell's remarks we were called to resume places for the next drive, and in the course of about an hour arrived at Monasterboice. Here are the remains of a monastery founded by St. Bute, or Boetius, who died in the year 521. It was destroyed by fire in 1097, and partially rebuilt, but it only existed for a short time after that calamity, the last abbot of whom any record exists dying in 1117. The relics of the edifice consist chiefly of the walls and gables of two churches, whose architecture witnesses their antiquity. Near them is a round tower, which, though the top is broken off, is 110 feet high and 51 feet in circumference at the base. The ascent of this tower is easily accomplished by means of the ladders fixed inside, and most of the party mounted to the top, from which charming views of the surrounding country were obtained. But the principal attraction is the three crosses the "yard" contains, and to them Mr. Fennell specially directed attention and explained their history and markings. Muredach's Cross, claimed to be the finest stone cross in existence, is 15 feet high, and was erected by Muredach, a King of Ireland, who died 924 A.D. The second cross, known as the high cross, is 27 feet high, and was erected about 920. These two crosses afford ample material for study in the rich, intricate inter-

lacings of the Celtic work, the delicate, subtle weaving of the stony strings into mazey traceries suggesting ease and reposeful harmony without the slightest effort or straining after effect—a perfection of design which marked the Irish work not alone in stone, but in the now priceless illuminated manuscripts and jewellery which that cultured age has bequeathed to us. Only a portion of the third cross remains, its destruction being ascribed to Cromwell's soldiers. A full-sized cast of Muredach's Cross can be seen in the Grainger Room in the Municipal Museum, Royal Avenue, and it is well worthy of the closest study.

We had now practically reached the end of the long day's work, but, so many objects of interest being presented for examination, the time had passed quickly, and the large party, full of life and go, had not noticed any signs of fatigue till the return journey to Drogheda commenced, when might be heard wishes for the "cup that cheers" that the members knew would be waiting their arrival at the White Horse Hotel, as the intervening space was quickly traversed by our sturdy horses, and soon nought was to be heard save the rattle of plates and cups.

A short business meeting was held—the President (Mr. W. J. Fennell, M.R.I.A.I.) in the chair—when Mrs. Woodside, Mrs. Rankin, Miss Jefferson, Miss Jones, Messrs. John Woodside, A. W. Stewart, and W. H. Wood were elected members, and it was announced that members would have time to visit St. Laurence's Gate and some of the remains of the ancient town, whose history is marked by many stirring events. Most of the party availed themselves of the opportunity ere assembling at the station, where the 6-40 train was taken for Belfast, and prompt to time, arrived there at nine o'clock, and the members separated, delighted with the day's proceedings.

It had been announced that the President and Vice-President offered prizes for the best collections of plants and lepidoptera made during the day, but it was found that none of the members had made any captures of butterflies or moths,

though for the plant prize several collections were handed in, and after a close struggle it was decided that Mr. W. J. C. Tomlinson had been successful, his collection containing specimens of 91 species.

The ornithological members of the party handed in the following list of birds (49 species) observed during the day:—Mistle-thrush, song-thrush, blackbird, redbreast, wren, sedge-warbler, whitethroat, golden-crested wren, chiffchaff, willow-wren, hedge-sparrow, dipper, great tit, blue tit, pied wagtail, grey wagtail, meadow-pipit, spotted flycatcher, swallow, house-martin, sand-martin, greenfinch, goldfinch, house-sparrow, chaffinch, linnet, lesser redpoll, bullfinch, corn-bunting, yellow bunting, starling, magpie, jackdaw, hooded crow, rook, skylark, swift, cuckoo, kestrel, heron, mute swan, ring-dove, corncrake, moorhen, coot, curlew, black-headed gull, common gull, and herring-gull. Among the molluscs the following were reported as being found:—*Succinea elegans* (very large specimens), *Hyalinia cellaria*, *H. nitidula*, *Helix rotundata*, *H. nemoralis*, *H. hispida*, *H. pisana*, *H. virgata*, *H. caperata*, *Vitrina pellucida*, *Pupa cylindracea*, *Clausilia bidentata*, *Limax marginatus*, *L. agrestis*, *Arion ater*, *A. circumscriptus*, and *A. subfuscus*.

Although the day was so favourable, very few *lepidoptera* were observed, only four species of butterflies being noted.

The pace was too fast during the day for the prosecution of much botanical work, but a number of plants were noted. Near the Boyne Obelisk *Carex riparia* was in beautiful fruit. The old walls about Mellifont Abbey yielded *Saxifraga tridactylites*, *Draba verna*, *Valerianella olitoria*, *Festuca rigida*, *Chelidonium majus*, and a profusion of *Antirrhinum majus*. *Polystichum aculeatum* was noted by the roadside in several stations. Other roadside plants were *Ballota nigra* and *Chenopodium Bonus-Henricus*. The American immigrant *Matricaria discoidea* was abundant on the outskirts of Drogheda, and thence to the Boyne Obelisk.

FAIR HEAD.

Honour to a Member.

The third excursion of the Summer Session took place on Saturday, 2nd July, the place selected for visitation being the majestic headland of north-east Antrim known as Benmore, or Fair Head. As early as half-past seven o'clock the Secretary was on duty at the rendezvous—the drinking fountain, Northern Counties Railway Terminus—and from this hour till 7-58 had a busy time in booking places for the procession of members and visitors who had decided on taking part in the day's proceedings. As usual, the courteous officials of the Northern Counties Railway Company—now Midland Railway—had reserved plenty of carriage accommodation, and, prompt to time at eight o'clock, the train steamed out of the station on its northward journey. Just now the country was looking particularly well, and after the rain of the previous day the emerald hues, for which our island is celebrated in song and story, were seen at their best, while the luxuriance of the growing crops held out the pleasing prospect of an abundant harvest. The various places of interest *en route* were well known to the majority of the party, but some were there to whom this part of the country was seen for the first time, and the time passed quickly as the strangers' attention was directed to one and another spot of scientific note, or by reminiscence among the habitues of past scenes of exploration and discovery. After passing Antrim, one of our members, an Englishman, saw for the first time a "turf bog," in which many were actively engaged in the work of preparing their stock of fuel for the winter. At Ballymoney the change to the narrow gauge railway was promptly effected, carriages on the Ballycastle line being reserved for the party, and shortly after due time we glided down the glen under the slopes of Knocklayd into Ballycastle Station. Here we were met by our President and Mrs. Fennell and by some members who were stopping in Ballycastle, and on counting it was ascertained that our party comprised no fewer than ninety-eight. At

this time Jupiter Pluvius was strongly in evidence, and it was decided to take shelter for a few minutes till the rain-god had expended his fury ere mounting the brakes and cars for our drive. Soon the welcome break in the clouds was visible, and in brilliant sunshine the vehicles were mounted and we drove off amid the cheers of the friendly inhabitants and visitors of this charming seaside town.

On reaching the Old Franciscan Abbey of Bun-na-Margie the members descended from the vehicles to inspect these interesting relics of a past age, and were conducted by our President (Mr. W. J. Fennell, M.R.I.A.I.), who pointed out the various noteworthy features, and gave a short account of their history and associations. We were informed by Mr. Fennell that as to the exact date of the abbey's foundation there is no authentic record; by some it is stated to have been founded in 1202 by William de Burgo, who at this period was Earl of Ulster, and nominally had the lands in his possession. It is told that Richard de Burgo brought the MacQuillans from Connacht and the Bissets from Scotland to keep the O'Neills in check. In later years the MacDonnells claimed these lands by descent from the Bissets and by conquest from the MacQuillans, whilst the O'Neills never missed an opportunity of harrying the MacDonnells and disputing their claim. In a manuscript list of Franciscan Monasteries in Ireland in the British Museum it is recorded that Bun-na-Margie was founded by Roy MacQuillan in the year 1500. No reliable authority has ever given the erection of this monastery to the MacDonnells, although as the conquerors and successors of the MacQuillans they assumed its patronage and made it their burial-place, and with their names it is now chiefly associated. The year 1537 saw the nominal suppression of this monastery and all others throughout the kingdom, but situated as it was in a remote district, with the lord and people still favourable, the monks lingered about its aisles for many years afterwards. The friary was destroyed by fire in January, 1584, though it must have been afterwards repaired, for in October, 1639, 700 Highland Scots

were confirmed in it, this being the last great religious ceremony associated with its name. With Bun-na-Margie is also closely associated the name of Sorley Boy MacDonnell, who was head of the clan during the latter part of the sixteenth century. Sorley Boy had driven the English from Carrickfergus; had fought the Queen's forces at Newry; had burned, in his castle yard of Dunanannie, on the point of his sword, the grant of his lands which Queen Elizabeth had bestowed upon him, saying what he had won by the sword he did not intend to hold by parchment. After a wild and stormy career he died in his castle at Dunanannie in 1590, and was buried within the precincts of the abbey. The general architecture of the ruins points to its having been built in the fourteenth century, though here and there later features are to be observed. The present remains of the monastery consist of a large church 99 feet long by 24½ feet wide, showing no appearance of division into choir and nave, and void of aisles or side chapels, being a plain rectangular structure, with the great window at the east end and three smaller ones on the south side. The present east window has the look of being inserted at a later date than the building of the church, as evinced by the arch and appearance of insertion on the outside. On a line with the east wall of the church on the north side are the domestic buildings, consisting of a refectory, with a smaller chamber, doubtless used for general purposes. The cloisters stood at the angle formed by the north wall of the church and the west wall of the domestic buildings; no traces of them at present exist except a few corbel stones and the marks of the line of roof along the walls. Against the south wall of the church stands the slated chapel and vault of the Antrim family. At a distance of 21 yards from the friary in an easterly direction stands the most distinctly picturesque portion of the ruins, the guest-house, gate-lodge, or kitchen; it is two storeys high, the northern gable bearing a high tottering chimney of cut stone. A rude old perforated cross stands at the west end of the church, and is said to mark the grave of Julia MacQuillan, the "black nun" of Bun-na-

Margie. The archæologists of the party were loth to leave this interesting spot, but, as the geologists, botanists, and zoologists were anxious to reach Fair Head, the whistle summoned us to remount the vehicles and proceed to our ultimate destination, and about half an hour's drive brought us to the farms where the brakes must perforce be abandoned and the remainder of the ascent accomplished on foot. Here we are in close proximity to Lough-na-Cranagh, one of the glacier-formed lakes of the headland, and while some of the botanists proceeded thither in search of rare specimens, we viewed the placid waters of the lake, in the midst of which rises a crannog or artificial island, one of the most perfect examples known to exist in this country of these dwelling-places of primitive man, though believed to have been inhabited well down into the historic period. After a short halt the ascent of the headland was resumed, the various marshes circumscribed, the numerous difficulties of the path safely negotiated, till we stood on the top of Fair Head, gazing down on the sea 600 feet below, and admiring the view displayed from its summit. A short time was devoted to the rearrangement of lunch-carrying, after which Mr. Wm. Gray, M.R.I.A., described the various features of the district, saying that the place where we stood was, geologically speaking, the most remarkable spot in Ireland. Fair Head is an intrusive sheet of dolerite, or coarse-grained basalt, which penetrated among the Carboniferous and Mesozoic rocks during a period of volcanic activity, and in the immediate vicinity are to be found representations of many ages of rock formations. Some of the oldest of the Irish rocks are to be found in Knocklayd, while near at hand are to be seen Carboniferous sandstone containing thick sandstones, shales, coal seams, thin limestones, and ironstones; together with schists, gneiss, and Liassic rocks. The face of Fair Head presents a perpendicular cliff of 400 feet high, which is gradually being weathered away, and at its foot is a talus, rising about 200 feet above sea level, composed of blocks broken from its face. None of the members attempted the descent of the head (practicable by the

Grey Man's Path), being content to hurl down stones and other missiles, and from the time occupied in their fall to calculate the distance to the talus slope below. It had been intended to descend into Murlough Bay, but, as several delays owing to rain had taken place, it was found that time did not permit us to visit this well-known haunt of many species of plants and animals, and we proceeded to rejoin the vehicles, which we could see waiting our arrival on the road above Murlough.

An hour's drive brought us to the Antrim Arms Hotel, Ballycastle, where the members were most hospitably entertained to tea by the President and Mrs. Fennell. After tea a short business meeting was held, at which it was announced that, in response to the representations of our Committee, in conjunction with the Linnean Society of London, the Prime Minister had promised to make a grant of £150 from the Royal Bounty Fund to our valued old member Mr. S. A. Stewart on account of his life-long services in the cause of science. This announcement was received with great applause by the members, and Mr. Stewart, who was present, was warmly congratulated by his many friends, all of whom willingly acknowledged their indebtedness to him for advice and assistance in their investigations. It may be well to remark that this movement originated with the Field Club Committee at the instigation of a valued lady member, and that they, assisted by the Linnean Society's Council, Lord Londonderry, and the local Members of Parliament, were alone instrumental in procuring this grant. Miss Muriel Hoy and Mr. John R. Macoun were elected members, after which it was moved by Mr. S. Shannon Millin, B.L., seconded by Mr. John Vinycomb, M.R.I.A., and supported by Mr. William Gray, M.R.I.A., that a cordial vote of thanks for their kind hospitality should be accorded to the President and Mrs. Fennell. This was carried with much applause, and Mrs. Fennell thanked the members, and remarked that she would like to see more Field Clubs established, as she was convinced they exercised a great power for good, not only by their

scientific labours, but also as a means of promoting the happiness of their members.

The unfavourable state of the weather and the impossibility of visiting Murlough Bay deprived the members of much opportunity of adding specimens to their collections, but withal some good work was accomplished. Mr. William Gray made a good find. He got a finely fossiliferous slab of middle Lias rock. This is a verification of Mr. Gray's discovery of this geological formation in Ireland. Up to the present it has been found nowhere else in this country. The ornithologists handed in a list of thirty species of birds observed, but it did not contain the names of any of our rarer species. Of *Lepidoptera* only a few of the commoner species were noted, but one of the members was successful in finding a caterpillar of one of our rarer species, the oak egger, *Lasiocampa quercus*. The botanists were more successful and succeeded in finding several of our rarer and more locally distributed plants. Among those may be mentioned the Welsh poppy (*Meconopsis cambrica*), rose-root (*Sedum Rhodiola*), winter green (*Pyrola media*), the smaller butterwort (*Pinguicula lusitanica*), the spring vetch (*Vicia lathyroides*), the wall pepper (*Sedum acre*), the red campion (*Lychnis diurna*), the marsh cinquefoil (*Comarum palustre*), the brittle bladder fern (*Cystopteris fragilis*), with many species of lichens brought home for identification.

The President and Vice-President had offered prizes for the best collections made during the day of plants and shells, that for plants being awarded to Miss May Porter, whose collection included 117 species, while the shell prize was won by Mr. George Donaldson, who handed in a box containing twenty species of land and marine shells. The 6-20 train brought the members back to Belfast, which was reached at two minutes past nine o'clock, when the members separated.

SLIGO.

Irish Field Club Union Conference.

July is looked forward to by the members of the Belfast Naturalists' Field Club, as the now general holiday occurring in that month affords an admirable time for many of them to participate in the popular "long excursion." This year proved of exceptional interest, as for the Club's long excursion it was decided to join with the field clubs of Dublin, Cork, and Limerick in the Triennial Conference of the Irish Field Club Union at Sligo; and here a most successful meeting was held from the 12th till the 18th July. An elaborate and varied programme had been formulated by Mr. R. Ll. Praeger, M.R.I.A., Secretary of the I.F.C.U., which was fully carried out, and to those who took part in the excursions, the week will be long remembered as another instance of his well-known powers of organisation and successful accomplishment. Doubtless in an undertaking of this sort the weather plays an important part, but at Sligo the elements proved most propitious; for, while the members' friends in Belfast were subjected to an exceptionally heavy rainfall on some of the days, the excursionists only experienced one heavy shower during the conference week.

Thirty-five members and friends assembled at the G. N. Railway Terminus in Belfast on the "Twelfth" morning, and were conducted to the reserved through carriages provided for their accommodation. On arrival at Clones they were joined by the Dublin contingent, and, by the kindness of the S., L., and N. C. Railway Company, the party was conveyed to Sligo without delay; the members thereby arriving at their destination about two hours earlier than is possible by the ordinary train service. At Sligo it was found that the Cork and Limerick members had already arrived, and shortly after, the luggage was distributed to all in the rooms allotted to them in the various hotels. Brakes were brought out to convey the party (now numbering upwards of sixty) to Rosses Point, where the afternoon was to be spent.

An hour's drive brought all to their destination, and after partaking of afternoon tea, the members were conducted to an eminence on the golf links, from which Mr. Praeger pointed out the various places of interest in the neighbourhood, described its geological features, and showed the routes to be traversed during the week. The members then scattered over the peninsula to indulge in their various pursuits till seven o'clock, when the return drive to Sligo was commenced. After dinner the members repaired to the Town Hall, in which the Mayor of Sligo had kindly placed a room at their disposal to enable them to arrange their collections and to compare notes and interchange opinions during the conference.

Wednesday morning dawned fair and bright, and immediately after breakfast, brakes were mounted and a start made for Drumcliff. Here are two ancient crosses, the principal one being considered one of the finest of the richly-sculptured "high" crosses of Ireland. On the opposite side of the road is a Round Tower, the only one of these structures in County Sligo. This Round Tower is placed by Miss Stokes in the first or earliest style of towers, being built of "rough field stones, untouched by hammer or chisel." The various archæological features were described by Mr. W. J. Fennell, M.R.I.A.I., after which the drive was resumed to the peninsula of Raghly, and lunch was partaken of close by the roofless baronial hall of the Gore-Booth family. After lunch the members walked by the yellow strand or through the sand-dunes to Knocklane, a singularly isolated conical hill of limestone (189 feet), rising right over the Atlantic, and commanding a magnificent view. The members were now busy at observation and collection, and the hours passed quickly till four o'clock, the time appointed for resuming the drive. The next stopping place was Lissadill, the residence of Sir Josslyn Gore-Booth, Bart., who had courteously invited the members to explore the beauties of his demesne, for which two hours were apportioned. The well-tended garden and grounds were much admired, and many valuable specimens

secured before returning to Sligo, and during the dinner and afterwards in the Town Hall many expressions of admiration at the day's outing were interchanged amongst the members. It had been announced that Mr. J. J. Andrew offered a prize for the best collection of plants made during the day, and after a spirited competition this prize was awarded to Miss Kidd, of the Belfast Club, whose vasculum contained 175 species.

At nine o'clock on Thursday morning all were ready for the day on and about Lough Gill, by many said to possess even as much beauty as the far-famed Lakes of Killarney. A short walk brought the party to Riverside, where boats were in readiness, and the rowing powers of those who volunteered to handle the oars received a severe test, as the outward journey proved to lie in the teeth of a strong easterly wind. But the athletic members proved their capability in this respect, and Slishwood was reached in due time, and all disembarked on the south shore of the lovely lake. A steep climb through the verdant wood brought the members to the top of Doonee Rock, a wooded knoll of limestone with a precipitous face overlooking the lake, from whence an exquisite view of the lake and its surroundings was obtained. After enjoying the prospect all descended to the shore, where lunch was ready, and on its conclusion a drenching shower proved somewhat unpleasant, but, as it only lasted for a short time, and was the only rain experienced by the members here, it failed to damp the enthusiasm and go which characterised the proceedings during all the time. On the rain's cessation the party started forward to explore Rockwood, where much was found to occupy attention, the luxuriance of the hay-scented fern (*Lastrea æmula*) and of other plants being frequently commented upon. The afternoon, bright and fine—the vegetation, seen to advantage after the heavy shower, proving a continual theme for conversation, and the assiduous attention of the collectors in the various sections—caused the time to slip away quickly, till all were summoned by the conductor's whistle announcing its expiry, and that

the return walk must now be commenced. A short interval was devoted to tea ere the boats were again entered, the row to Sligo being easily accomplished with the aid of the now favourable wind. After dinner a short conference on field club work was held in the Town Hall, the President of the senior club (Belfast) (Mr. W. J. Fennell) occupying the chair. Mr. Fennell, in his opening remarks, referred to the power gained by the cohesive action of united Field Clubs, and mentioned instances in which their recommendations had received attention. A hearty vote of congratulation to the veteran botanist, Mr. S. A. Stewart, A.L.S., F.B.S.Edin., who had received a grant from the Royal Bounty Fund, was passed; and a resolution calling the attention of the authorities to the necessity for increasing the staff of our National Museum in Dublin was passed on the motion of Professor Symington, F.R.S., seconded by Mr. W. F. de V. Kane, D.L., and supported by Mr. R. Welch. An interesting discussion on primary education was opened by Mrs. Fennell and spoken to by Messrs. G. H. Carpenter, R. Ll. Praeger, W. H. Patterson, and other members. Mr. Kane called attention to the advisability of members giving notice of localities in which underground rivers or pools were situated, in order that their fauna might be investigated. On the conclusion of the conference the B.N.F.C. held a short business meeting, at which Mrs. John Clarke, Messrs. J. Eldon Smith and Henry R. Vaughan were elected members. A prize presented by Mr. John Jaffé for the best collection of aquatic plants was awarded to Miss Mackintosh, of the Dublin Club.

Immediately after eight o'clock breakfast on Friday morning a start was made for Glencar, with its picturesque lake, from the sides of which grey cliffs rise on either hand to an elevation of one thousand feet. This proved an ideal spot, and, while all wandered to and fro examining the beautiful waterfalls, ravines, and other physical features, the indefatigable collectors amassed many treasures, geological, botanical, and zoological. At six o'clock brakes were again mounted and the return to Sligo speedily accomplished.



Entrance to Glencar.

Showing the southern cliff-wall of Carboniferous Limestone.

Saturday morning gave promise of an ideal day, and all expectations were realised. Starting from the hotels at nine o'clock, the members were driven to Carrowmore, where Mr. W. F. de V. Kane gave a short account of the amazing wealth of stone monuments to be observed in the immediate vicinity. The next stopping-place was close at hand, where the ruins of an ancient church and stone circle were inspected, after which the brakes were remounted and the drive continued to Glen Lodge, on the shore of Ballysodare Bay. Here the members were met by a local gentleman, who conducted them to Knocknarea Glen, a remarkable straight cliff-walled fissure, wooded and hung with ferns, mainly of the hart's-tongue species, in wonderful luxuriance. After lunch on the shore the party divided, the majority ascending Knocknarea (1,078 feet), while others walked round the hill examining the sand-dunes, which contain evidences of inhabitation by prehistoric man, and all meeting at the village of Strandhill, from whence at six o'clock the brakes conveyed the members back to Sligo. After dinner an exhibition and demonstration of the various scientific results of the excursion was given in the Town Hall, and was largely attended not only by the members, but by the Mayor of Sligo and many of the local inhabitants, and proved a great success. A prize for the best find of the week had been offered by Mr. Fennell, and this was awarded to Dr. D'Evelyn, of the Belfast Club, for a flint arrow-head found in one of the kitchen-middens. On the motion of Mr. W. J. Fennell, seconded by Mr. W. F. de V. Kane, and supported by Mrs. Henry Thompson and Mr. John Jaffé, cordial votes of thanks were passed to the ladies and gentlemen who had given permission to enter their grounds, and who had in several ways rendered assistance, and to Mr. Praeger, to whose exertions the success of the meeting was entirely due.

Sunday is a *dies non* with the Field Clubs, and the members were on this day free to make their own arrangements. Many visited the ruins of Sligo Abbey and the far-famed holy well on the margin of Lough Gill, while others indulged in more extensive excursions.

Monday morning saw the break-up of the party, and at 10-5 the Belfast and Dublin members were being conveyed from Sligo amid the hearty cheers of the Limerick members, who were to start by a later train. By some misunderstanding the through carriages had not been retained in Sligo, and this caused some trouble at Enniskillen; but the courteous stationmaster there promptly supplied carriages, to which the luggage was transferred, while the members, under the escort of Mr. Thomas Plunkett, M.R.I.A., utilised the hour's wait in visiting the Cole Monument, at the base of which Mr. Plunkett had thoughtfully provided refreshments for the party. Enniskillen was left behind at 1-30, and shortly before 5 o'clock the members separated at Belfast station.

The September number of the *Irish Naturalist* was entirely devoted to this conference and excursion, and in addition to 55 pages of letterpress, the issue was much enhanced by the inclusion of 19 plates. Many valuable observations are recorded, and some notable discoveries rewarded the exertions of the members. The *vertebrata* report is compiled by Messrs. Robert Patterson and Nevin H. Foster, and principally relates to the seventy species of birds observed. The molluscan fauna is treated by Messrs. Robert Welch and A. W. Stelfox and is an exhaustive report, a most interesting feature of which is the first recorded find in Ireland of a sinistral form of *Helix aspersa*. The insect reports include many new County records, and one species *Xenylla brevicauda*, new to the British fauna. Some of the water-mites collected proved also to be new species for the British Islands.

The botanists of the party found plenty to interest them, and many new stations for plants or confirmation of old stations merited publication; while their *herbaria* are made richer by the good collections obtained.

The district proved very interesting to the geologists, Sligo being situated in a typically Carboniferous country, where the limestone graduates upwards into the sandstones and shales of the overlying Millstone Grit and Coal Measures;

and fringing one of those deep indentations of the west coast of Ireland, which generally coincide with the substitution of Carboniferous limestone for the older metamorphic series.

Archæology and folklore are treated of by Dr. D'Evelyn and Mr. W. J. Fennell, and some of the flint implements found are illustrated and described.

ROUGHFORT AND TEMPLEPATRICK.

(Half-Day Excursion.)

The fifth excursion of the Summer Session (half-day) took place on Saturday, 30th July, the places selected for visitation being Roughfort and Templepatrick. Upwards of sixty members and friends assembled at the Linen Hall Library, and at 2-45 were comfortably seated in the well-appointed brakes provided by Messrs. Melville & Co., Limited. The route through the city was enlivened by processions of excursionists, with bands playing and banners flying, which somewhat retarded progress, but after passing Carlisle Circus the pace was accelerated, and soon the din of the city was exchanged for the peaceful quiet and fresh air of the upland country. From Glengormley the Antrim Road was traversed for about two and a half miles. On all sides agriculturists were busy at the various stages of their haymaking process, the scent of the new-mown hay, wafted on the gentle breeze, apparently not causing any symptoms of disagreeableness so much dreaded by those subject to attacks of hay fever. Turning to the left off the main road, about half a mile's drive brought the members to the first stopping-place, and all dismounted by the side of the earthen erection which gives its name to the quiet little village of Roughfort. This fort is one of a series of about twenty noted in the district, many of which are fast disappearing or have been altogether removed, either as obstructions in the way of improved agricultural operations, or, as seems to be the case with Roughfort, the material being for some purpose carted away. After

a short examination of the fort, the members were conducted to a field a short distance to the east, containing a fine example of an entirely different type of erection known to archæologists as kistevaens, but more familiarly termed giants' graves, or grannies' graves, by the country people. The one visited is in good preservation, and it is satisfactory to know that this important monument is much respected by the land-owner, and that it is not likely to be injured or interfered with in any way. It is formed of large blocks of stone set on edge a few feet apart, the space between them being spanned by nine of the largest blocks, thus forming a low chamber, or series of chambers, about forty feet in length. Mr. W. H. Patterson, M.R.I.A., gave a very interesting account of what is known about these structures, and in the course of his remarks said that kistevaens were believed to be of the same age as the cromleacs, stone circles, and standing stones, found all through Ireland, and were doubtless burying-places of the great ones of a long past age. Originally they had been covered with mounds of earth, but in most cases these had long since either weathered away or had been removed by man's agency. It might be if the adjoining fort were opened it would be found to contain a similar structure. The origin of the name of this kistevaen (Cairn Grainne) had given rise to considerable discussion, some maintaining that it meant "the heap of the sun," but the more probable idea being that it signified the Cairn of Grainne, a name well known to students of Irish legendary lore. Grainne was wife of one of the ancient kings of Ireland, and cast her spell around Dermot, and the pair were forced to flee from the pursuing armies of the King. Legend says so close was the pursuit that they were forced to change their locality daily, and that these Grainne's (corrupted into grannies') "graves" marked the places where they nightly remained. Mr. Patterson's lucid explanation was listened to with great attention, and on its conclusion he was warmly thanked by the members. The operations of the photographic section at this point were rather interfered with in consequence of a heavy thunder-

shower, and on its cessation the brakes were remounted and the drive resumed.

For about three miles the road gradually descended, and under portentous banks of clouds the village of Templepatrick was entered shortly after five o'clock. Tea had been announced for 6-30, but, on its being found that the manager of the Templetown Arms Inn had all in readiness, it was decided to partake of it on arrival and while the heavens expended their fury; and this slight change in the programme proved highly beneficial, as by the time tea had been disposed of the sun shone out and enabled the members to pursue their various avocations in comfort. By the kind courtesy of Captain Chichester, the beautiful demesne of Castle Upton was thrown open for the visitors, and the members proceeded to the ancient burying-ground situated therein. Here are many interesting grave slabs, and the members found much to occupy their attention, the quaint inscriptions incised on some of the stones forming ample themes for conversation. After examination of the graveyard, the party were conducted by the head gardener through the grounds and greenhouses, and all were delighted at the well-tended appearance of the place. The conservatory yielded a brilliant picture, and presented a perfect blaze of harmonious colourisation; trusses of zonal pelargoniums of varied shades, interspersed with crimson and yellow celosias, silvery-leaved centaureas, and coleuses of many rich velvety hues, the whole blending into a dazzling display of colour, relieved by the soft green of the fern collection. Among the ferns were many choice specimens of *Adiantum* and *Pteris* and of the Welsh polypody (*Polypodium vulgare* var. *cambricum*), and special attention was called to the hare's foot fern (*Davallia Canariensis*), the squirrel's foot fern (*D. bullata*), and the stag's horn fern (*Platycerium alcicorne*). In the open garden the herbaceous borders contained many fine plants, groups of a carmine-coloured *spirea* being particularly admired. A relic of the past in the form of an old coach suspended by leather straps instead of the steel spring mount-

ing of modern coachbuilding, was shown to the members, and its history and association gave rise to many an old-world story. The walks through the verdant pleasure-grounds are all gravelled with rhyolite, which is obtained from the Templepatrick quarries, where it occurs as an intrusive between the masses of basalt and chalk.

A varied selection of zoological and botanical specimens was collected, and carefully packed away for further study and investigation, the best plants noted being the marjoram (*Origanum vulgare*), which grows plentifully in the old graveyard here. A few plants of that local species the scale-fern (*Ceterach officinarum*) were observed, and very large specimens of the wall-rue (*Asplenium Ruta-muraria*), some of the fronds measuring about four inches long, were noted.

A short business meeting was held—Mr. W. H. Patterson, M.R.I.A., presiding—when, on the motion of Mrs. Fennell, seconded by Mr. F. A. Porter, a cordial vote of thanks was passed to Captain Chichester for his kindness in permitting the members to inspect his grounds, and Miss C. Cocking, Miss M. Cocking, and Mr. L. P. K. Fisher were elected members.

At 7-45 the conductor's whistle announced time for the return, and hardly had the members been seated in the brakes when a drenching shower descended, and attended the homeward journey for a few miles, but on approaching Belfast the state of the road showed that here very little rain had fallen, and shortly after nine o'clock the members separated at the Linen Hall Library.

ARDGLASS.

The sixth excursion of the Summer Session took place on Saturday, 13th August, to Ardglass. During this month many of the members are from home, and consequently the August excursion is not so largely attended as those taking place earlier in the session. This excursion proved no exception to the rule, only twenty-four members and friends participating, who spent a pleasant and profitable day in

the neighbourhood of this improving watering-place. It had been intended that on arrival in Ardglass the party should divide, some proceeding to Rathmullan and others going northwards to Ballyhornan Bay, but, none of the members being desirous of visiting Rathmullan, it was decided that there should be no division, but that all should keep together for the day.

The County Down Railway Company had reserved carriages for the members, and Ardglass was reached shortly after eleven o'clock; here vehicles were in readiness, and the drive commenced. The road skirts the northern shore of the harbour for about half a mile, and, the tide being full in, the picturesquely-situated town was observed to the best advantage. This place was formerly one of the foremost ports in the North of Ireland, and at the time of the Anglo-Norman invasion its possession was deemed of so much importance that seven castles were built by De Courcy for its protection. The ruins of some of these castles, as well as of fortified stores erected by a trading company under a grant from Henry IV. and by subsequent traders, now occupy conspicuous sites in the town. Jordan's Castle, the most perfect of these, rises among the houses near the quay, and is said to derive its name from Jordan de Saukvill, a Norman whose family had settled here in 1177. It consists of a lofty and slender tower, 70 feet high, of graceful architecture, and in an excellent state of preservation. The Jordan arms—a cross and three horse-shoes—are to be seen on a stone near the top, and one corner tower is occupied by a still perfect columbarium. The road now tends away from the shore, and on the summit of the Hill of Ardtole (*ard Tuathail*, Tuathal's height) was seen the very ancient Church of St. Nicholas, appropriately dedicated to the patron saint of sailors. This was formerly the Parish Church of Ardglass, and the east wall, containing a large arched window, still remains, as well as the side walls.

A couple of miles further on our attention was directed to an Anglo-Norman grave-slab of unusual and beautiful

design, built into the wall of Dunsford Chapel; and from here a drive of two miles brought us to Benderg Bay, the termination of our outward journey. Here the members descended to the shore, and lunch was partaken of under the steep cliffs of conglomerate with interstratified sands, which rise just above high-water mark.

After lunch the members separated to pursue their varied avocations, most of the party proceeding to Killard Point, which forms the southern side of the entrance to Strangford Lough. Right opposite in mid-channel lies the dangerous Angus Rock, marked by a tall white beacon, with the lower reefs of Ballyquintin Point, the northern side of the entrance, behind it. Looking up the narrow channel, through which with every tide rush four hundred million tons of green sea water, we observed the villages of Strangford and Portaferry, with the ruins of their castles built to guard the narrow entrance of the well-named lough, *Strang-Fiord*—the violent inlet.

The district proved very instructive to the geologists of the party, the coast line from Ardglass to Ballyhornan being composed of Silurian slates, usually tilted at high angles, the result of excessive folding, and containing many dykes of high interest; the drifts of Ballyhornan and Benderg Bays consist largely of gravels, now cemented together (calcreted) by the action of the limy waters, and containing many specimens of red Castle Espie limestone, doubtless conveyed hither by glacial action, which has also left many characteristic markings on the rocks of the district. The botanical section obtained many specimens of some of our rare or more locally distributed plants, among which may be mentioned the rest-harrow (*Ononis repens*), very abundant on the sand-hills, and in beautiful bloom; the sea holly (*Eryngium maritimum*), with its striking, steely-blue inflorescence lighting up the fringe of the sand-hills, the sea convolvulus (*C. Soldanella*), with its glossy green leaves and delicate pink flowers, the sea meadow rue (*Thalictrum dunense*), the round-leafed mallow (*Malva rotundifolia*), the knotted hedge-parsley

(*Caucalis nodosa*), and the samphire (*Crithmum maritimum*), found growing in Ardglass Harbour.

In the absence of woodland it was not to be expected that many of our land birds would be observed, but it was rather remarkable that neither a robin, a chaffinch, nor any of the warbler family were seen. Among the shore-frequenting birds a few rock-pipits, oyster-catchers, and ringed plovers were noticed, while redshanks and curlews proved very numerous. Of sea birds four species of gulls and two species of terns were seen, and in all thirty-seven species of birds were observed during the day. The molluscan fauna recorded as being observed included *Helix acuta* and *H. nemoralis* (very plentiful among the sand-hills), *Helix pulchella* (fully-grown specimens, but only measuring half the common size), *Cochlicopa lubrica* (a small sand-hill variety), *Vertigo edentula*, *Pisidium fontinale*, and the beautiful though common European cowry (*Cyprœa europœa*). In the hotel we were shown a fine specimen, measuring six and a half inches in length, of the red whelk or buckie (*Chrysodomus antiqua*), which had been taken by dredging in Ardglass Harbour a few days previously. As the day was rather gloomy, very few *lepidoptera* were observed, but collections of beetles, amphipods, and isopods were brought away for further investigation.

Some of the members visited St. Patrick's well, where pious pilgrims still leave shreds of cloth, according to the ancient Celtic custom; and at four o'clock the vehicles were again resumed. Ardglass was reached shortly before five o'clock, and an excellent tea was served in the Castle Hotel. A short business meeting was held after tea, when Mr. Frank Holland was elected to membership. The President had offered a prize for the best collection of plants made during the day, and this was won by Miss Kidd, whose vasculum was found to contain 102 species. A youthful member, Miss Yvonne Courvoisier (who also collected assiduously on the Sligo excursion) submitted a creditable collection, and was awarded a special prize. The Vice-President's prize for the

best collection of shells was won by Mr. George Donaldson, with forty-five species.

The 6-35 train brought the party back to Belfast, when the members separated shortly after eight o'clock.

HELEN'S TOWER.

(Half-day Excursion.)

The seventh excursion of the Summer Session took place on Saturday, 3rd September, when about fifty members and friends proceeded to Helen's Tower. The County Down Railway Company had reserved for the accommodation of the party a carriage attached to the two o'clock train, and before starting time all were comfortably seated therein, and Bangor was reached in a little under an hour. Here the members were escorted to the brakes in waiting by Mr. W. H. Gallway (who had undertaken the making of all arrangements for the comfort of the party in Bangor), and a pleasant drive through the fertile and well-cultivated district surrounding this fashionable watering-place brought us to the entrance to Clandeboye Demesne. From this the drive continued for nearly two miles through the woods and park lands, until after a sharp ascent, the members stood at the base of Helen's Tower. The Dowager Marchioness of Dufferin and Ava had courteously granted permission for the Club to visit this interesting place, and was present to receive the members. Lady Dufferin having expressed a hope that all would enjoy the visit, the members were conducted to the top of the tower from whence the climbers were rewarded with a magnificent view of the surrounding country. Looking northwards, the full extent of Belfast Lough was displayed, beyond which Blackhead, Whitehead, and Carrickfergus were conspicuous in the brilliant sunshine, and backed by the hills of County Antrim. Southwards Strangford Lough, studded with its picturesque islands, presented a charming picture, the celebrated Island Mahee, containing the obscure remains of the ancient ecclesiastical

colony of Nendrum or Nedrum, showing up prominently in the foreground, and by the aid of field-glasses could be discerned the ruins of Sketrick Castle, one of the strongest of the twenty-seven fortresses built on Strangford Lough by the Anglo-Normans after John de Courcy's invasion in 1177, but now fast crumbling away. Many places of interest in the surrounding neighbourhood were pointed out and commented upon, while the distant views embraced Slieve Croob, the Mourne Mountains, Scotland, and the Isle of Man. The tower rises on the top of a wooded hill overlooking the demesne of Clandeboye, and the woods which embosom it were seen at their loveliest, as some of the trees were now assuming the warm tints of autumn, which, mingled with the varied shades of green displayed by the firs and other trees, formed a picture not easily to be forgotten by those who beheld its beauties. The name of the estate is derived from the ancient district of *Clannaboy* (*clann Ardha buidhe*, the clan of yellow Hugh, who was one of the O'Neills of Tyrone; with his followers he crossed the Bann in the fourteenth century, and, establishing himself here, gave his name to the district), but in the second year of King James the lands were transferred by an arrangement with Con O'Neill (after his assisted escape from the Castle of Carrickfergus, where he had been incarcerated on pretence of rebellion) to Sir Hugh Montgomery and James Hamilton, the ancestor of the present owner. Helen's Tower was erected about 1850, and enshrines some beautiful lines written by Helen, Lady Dufferin, on the occasion of her son's (the late Marquis of Dufferin) coming of age in 1847, and the building is named after this talented authoress. It also contains verses by Robert Browning, Lord Houghton, and Lord Tennyson, as well as the verses by Rudyard Kipling, in which the women of India return homage to the now Dowager Lady Dufferin for her philanthropic work in India while the late Lord Dufferin was Viceroy.

After examination of the tower the members separated to indulge in their varied pursuits, and collections botanical

and zoological were made, while some took the opportunity to visit the Conlig lead mines, where they procured many specimens of minerals. The time passed quickly, and at 5-45 all were seated in the brakes and the return drive commenced. Bangor was reached at 6-45, and without delay tea was served in Fegan's Temperance Hotel. After tea a short business meeting was held—Mr. W. J. Fennell, M.R.I.A.I., presiding. The President announced that the present excursion concluded the Summer Session, and the popularity of these excursions was evinced by the fact that the attendance had averaged no less than seventy-five for the season, constituting a record in the Club's history. Mr. Fennell also announced that the Conversazione would be held probably in October, when it was expected that all members would exhibit articles of interest, and the photographers were requested to have lantern slides prepared from the photographs taken on the Club's excursions, which could be shown during the evening. Attention was also directed to the issue of the *Irish Naturalist* for September. This is a special number, devoted entirely to the valuable scientific work accomplished at the Sligo conference and excursion of the Irish Field Club Union in July. Members were also asked to contribute papers during the forthcoming Winter Session, those desirous of so doing being requested to communicate with the Secretaries as soon as possible. On the motion of the President, seconded by Mr. W. H. Patterson, M.R.I.A., a cordial vote of thanks was accorded to the Dowager Marchioness of Dufferin and Ava for her kindness in permitting the members to inspect Helen's Tower, and the election of Mrs. Burgess, Messrs. George A. Boyd, Walter S. Pelan, and H. R. Macnamara to membership brought the proceedings to a close.

The members returned to Belfast by the 7-45 train, and separated shortly after eight o'clock, all expressing sorrow that the successful excursions of 1904 were now events of the past.

Winter Session.

NOTE.—*The authors of the various Papers of which abstracts are here appended, are alone responsible for the views expressed in them.*

ANNUAL CONVERSAZIONE.

The Club inaugurated the Winter Session of its forty-second year by a highly successful conversazione, which was held in the Exhibition Hall of the Botanic Gardens Park, on 25th October. The attendance of members and their friends numbered upwards of 400, and the proceedings were characterised by the amount of "go" which has proved a feature in the Club's undertakings, while the numerous and varied exhibits attested the members' capabilities in scientific study and research. The Club looks back with pride on the useful work performed by its members in the past, and, judging by this exhibition, it is evident that it now possesses an energetic band of enthusiastic workers, while with increasing membership it is to be expected that in the years to come its traditions will be fully sustained.

Tea was served from seven till eight o'clock, the tables being presided over by the following lady members of the Club:—Mrs. Fennell, Mrs. Foster, Mrs. Hobson, Mrs. Gallway, Mrs. Green, Mrs. Orr, Mrs Wheeler, Mrs. Gregg Wilson, Mrs. Wright, and Mrs. Vinycomb, the catering having been entrusted to the Bloomfield Bakery Co., whose efforts amply sustained their reputation in this respect. During the evening the exhibitors were most attentive, and were granted many opportunities for giving information on their various subjects to those who examined their exhibits, which included the following:—

Botany.—Collection of equisetums (horse-tails), barren and fertile stems, Mr. N. Carrothers; American plants, many of them rare British species, Mr. George Donaldson; two cases of grasses, Mr. F. C. Forth, A.R.C.Sc.I.; seed vessels of plants, Mr. W. A. Green; "Sapucaia" and "Brazil" nuts, showing mode of growth, Mr. John Hamilton; mounted plants collected during the Irish Field Club Union Sligo Conference week (July, 1904), Miss Kidd; collection of *fungi*, Mr. A. Milligan; mounted plants collected during the past summer, Mr. H. Lamont Orr; varieties of British ferns, Mr. W. H. Phillips, President of the British Pteridological Society; *Blechnum Spicant* var. *tricapitatum*, Porter, a new variety discovered by exhibitor in Co. Down, and for which he obtained certificate from the Pteridological Society, Mr. Wm. Porter; rare plants from Achill Island, rare plants from Fermanagh Highlands, *Glyceria festucæformis* (a grass new to the British flora, discovered by the exhibitor in County Down), from new stations, Mr. R. Lloyd Praeger, B.A., M.R.I.A.; flowering plants from Cambridgeshire and Sussex, hygroscopic plant from the desert, Rev. C. H. Waddell, B.D.

Zoology.—Collection of moths, Mr. William Allan; birds' nests and eggs, pied blackbird, Mr. John Cottney; marine shells from Bangor, Mrs. Foster; rare visitors to Ireland captured in County Down, waxwing (*Ampelis garrulus*), rough-legged buzzard (*Buteo lagopus*) thirteenth Irish specimen recorded, turtle dove (*Turtur communis*), little auk (*Mergulus alle*), Mr. N. H. Foster, M.B.O.U.; case of moths collected during the past season, Rev. George Foster; collection of echinoderms (sea urchins), Mr. W. H. Gallway; marine shells, Mr. W. A. Green; trap-door spiders and their nests from the Riviera, Miss Hill; British insects of the orders *coleoptera*, *hemiptera*, *lepidoptera*, *hymenoptera*, and *neuroptera*, Rev. W. F. Johnson, M.A., F.E.S.; tit's nest in centre of tree section, Mr. J. H. MacIlwaine; collection of butterflies and moths, Mr. J. N. Milne; pond life (microscopic demonstration), Mr. W. S. M'Kee; foreign land shells, Mr. W. F. M'Kinney; trap-door spider and nest from South Africa, Mr. H. L. Orr;

moles' nests from Tiddeswall Dale, Derbyshire, and photo of moles' fortress laid open to show nest *in situ*, shells from the "garden" surrounding the "playing-house" of the bower bird, map of Ireland showing distribution of albino and pied birds from MS. notes, Mr. Robert Patterson, F.Z.S., M.R.I.A., M.B.O.U.; cave remains of mammals and birds (including bones of lemming, an animal long since extinct in Ireland), from Kesh, County Sligo, Dr. R. F. Scharff, F.Z.S., M.R.I.A.; leaf insect from Ceylon, Rev. C. H. Waddell, B.D.; land and fresh water mollusca of the Triennial Conference (Sligo, 1904), including sinistral *helix aspersa*, the first recorded Irish specimen, map showing the localities explored during Sligo conference, rare shells alive from Millersdale, Derbyshire; photos illustrating the natural habitats of many rare and local shells, Messrs. R. Welch and A. W. Stelfox; illustrations of variation in nature and under domestication, Professor Gregg Wilson, D.Sc., M.R.I.A.

Geology.—Magnesian limestone concretions from Sunderland, and photos, Dr. George Abbott, F.G.S.; British geological photographs from the British Association series, Miss M. K. Andrews; carboniferous limestone corals from County Sligo, compact and vesicular "toadstone" from Millersdale, Derbyshire, and photo of same *in situ*, Mr. Robert Bell; fossils collected in 1904, including crocodilean scute (first evidence of crocodile in Ireland), Mr. William Christy; sample of chalcedony from Carnmoney Quarries, Mr. W. J. Fennell, M.R.I.A.I.; fossil foraminifera from glacial sands, chloritic sands and yellow sands, recent foraminifera, &c., Mr. George C. Gough, A.R.C.S., F.G.S.; illustration of local geology for national schools, geological specimens, Mr. William Gray, M.R.I.A.; typical specimens of Scotch pebbles (agate, onyx, and jasper), some examples of modern agate-work, Mr. J. Strachan; variegated marble from Middleton, County Cork, perforated primary limestone from Sessiagh Lough, County Donegal, foraminifera from Lower Lias, Glauston, England, under microscope, Mr. Joseph Wright, F.G.S.

Miscellaneous.—Historical views of Heidelberg, Miss

Andrews; educational models and diagrams, models of kist-vaens, stone circles, etc., Mr. Wm. Gray, M.R.I.A.; measured drawings of souterrains, model of a souterrain, Mrs. Hobson; a series of twenty-two water-colour sketches of Belfast Lough, Sligo district, and Achill Island (this exhibit attracted much attention, and its artistic merits were favourably commented upon), Fraulein Magnussen; old spears, pikes, and other weapons, Mr. W. F. M'Kinney; mineral block from Greenland, old Dutch lamps and tinderboxes, some types of primitive Ulster candlesticks, old leather-covered water-jug, bronze cooking vessel, Mr. Robert May; specimens of work from Ballycastle toy industry, Mrs. Riddel; sprays of ivy, holly, and rose, electro-plated, Mr. D. Steel; natural history photographs, Mr. R. Welch; new drift survey map of Belfast and district and accompanying illustrated memoir, book stall, at which could be obtained the Club's "Guide to Antrim and Down" (1902), the proceedings, reports, appendices, reprints, and the Sligo Conference number of the *Irish Naturalist*, &c., the Librarian (Mr. George Donaldson).

At half-past eight o'clock a short business meeting was held, the President (Mr. W. J. Fennell, M.R.I.A.I.) in the chair. In the course of his remarks the President said—Another summer had passed away, and now once again it became his pleasant duty to welcome them all to the inaugural meeting of their winter session, which promised to be a busy and a useful one. He thought they might congratulate themselves on having had a Summer Session productive of much good work in the field, with results that in due course would take their places in the permanent records of their work. Many might think such "records," "proceedings," or "reports," as they were variously called, were not of great consequence, but at the meeting of the British Association at Cambridge this year he was much struck at finding they were held in high estimation and sought after as works of reference. (Hear, hear.) He also thought that their Club might congratulate itself on the fact that two of their members had received special honours for their labours. One, their veteran botanist,

Mr. S. A. Stewart, had been elected an associate of the Linnean Society, and had also received a further mark of honour from the First Lord of the Treasury, Mr. Balfour. (Applause.) Another, their esteemed friend Mr. W. H. Phillips, had been elected president of the British Pteridological Society, a most distinguished honour, and a recognition of his life's work amongst the ferns of Ireland. They offered both these gentlemen their heartiest congratulations. (Applause.) The Winter Session of the Club consisted formerly of a series of monthly meetings, at each of which a paper was read, and a short discussion followed. This form was apt to become fossilised, and the Committee recognised the fact that life and energy were also necessary, and that beaten tracks should not be too rigidly adhered to. In order therefore to bring members more in touch with each other—and their work and special studies—the Club-room was established, and opened every Wednesday evening to allow members to meet and confer one with another. So far this has been successful, but they were desirous of still further extending its usefulness, and they earnestly asked all who desired to give or receive information, or in any way to help on the work of the Club, to take advantage of these informal Wednesday evening meetings. He might mention that at least one member of the Committee was always present, and that their Library was then open to every member of the Club. Another important point he desired to mention was that the sections were open to all members. He found that some young members had a hesitation to join them—even though they were anxious to commence such studies as botany or geology. He could, however, assure them if they sent their names to the Secretaries they would receive hearty welcome and encouragement from all members of the section. In connection with these studies he would like to mention that classes for botany, geology, physiology, and also a new class, which should prove very interesting, on determinative mineralogy had been formed by Mr. Forth in the new Technical Institute, which students in these subjects should take advantage of; and Mr. Gough, of

the Queen's College, had decided to give a course of lectures at the Queen's College on geology, which would be duly announced, and, as his syllabus contained separate lectures "The Formation of the World," "Nature as a Sculptor," "Earthquakes and Volcanoes," "Minerals," "The Making of a Rock," "Geology of Ulster," "The Ice Age," &c., it would be seen how interesting and instructive the lectures would be, and if to these was added the work in the field under the guidance of the section, their value would be much augmented. To the already existing sections of the Club he should like to see added a section of archæology to give the study a more recognised position, and he believed it could do much good, especially in using its influence to preserve the ancient buildings and monuments of the country, a duty which the Board of Works seems anxious to be relieved of. During the coming session the series of lectures arranged for would be of great interest. That in December would be by Dr. St. Clair Boyd on "Egypt," and would be followed by others on "Folk-lore," "Botany," "Geology," &c. They were desirous that the public should realise that the Club was not a picnic society, but one that existed for real, earnest, hard work, made cheerful by mutual co-operation and assistance, quickly and willingly given; and where rivalry did exist it was the rivalry that helped to make friendship a thing worth having. He had also the pleasant duty of welcoming the strangers present, Mr. Wright, of the North Hants Field Club, and Mr. R. Ll. Praeger, of the Dublin Naturalists' Field Club.

On the conclusion of the President's speech, Mr. William Gray, M.R.I.A., moved, and Mr. W. H. Phillips seconded, that Mr. Thomas Plunkett, M.R.I.A., Enniskillen, be elected an honorary member of the Club, which was carried by acclamation. The following seventeen ladies and gentlemen were then elected members:—Mrs. Gregg Wilson, Mrs. E. S. Blair, Mrs. Abraham, Mrs. Walkington, Miss Winifred Linnell, B.Sc., Miss Elizabeth Willis, Miss Sara Entrican, Rev. W. P. Carmody, Messrs. G. F. Gilliland, John Kyle

Stephens, Robert T. Hewitt, James Miskimmin, Leslie Craig, Daniel M'Gillvery, Robert John Walsh, F. W. Malone, and George A. Webb. The remaining business consisted of the presentation of prizes to those members to whom they had been awarded during the year, and this was gracefully performed by Mrs. Fennell, the recipients being Rev. George Foster, Club prize for a collection of *lepidoptera;* Mr. N. H. Foster, Mr. Phillips's prize for a collection of ferns; Miss Kidd, Miss May Porter, and Mr. W. J. C. Tomlinson, President's prizes for best collections of plants made on excursions to Ardglass, Fair Head, and Boyne Valley; Mr. George Donaldson, Vice-President's prizes for collections of land-, fresh-water, and marine shells taken on Ardglass and Fair Head excursions; Miss Yvonne Courvoisier, special prize presented by the Secretary for botanical collections made on summer excursions. On the conclusion of the business meeting, the lights were lowered and the lantern display proceeded with, when a large number of interesting views, principally taken on the Club's summer excursions, were projected on the screen, and described by Messrs. Fennell, Green, Hogg, and Welch, Mr. A. R. Hogg manipulating the lantern with his accustomed ability. Afterwards, the hall having been again lighted up, further opportunity was afforded for examination of the exhibits, and the display and explanations of the exhibitors elicited many tributes of admiration from the members and their friends. The proceedings terminated shortly after ten o'clock, when the members separated, all expressing satisfaction at what must be entitled one of the most successful of the Club's Conversaziones.

The first meeting of the Winter Session was held in the Museum, College Square North, on 15th November, and was largely attended by members and friends. Previous to the meeting the usual "Science Gossip Half-hour" was taken advantage of by the members for informal discussion in the Club-room. At eight o'clock the members repaired to the

lecture hall, when the President (Mr. W. J. Fennell, M.R.I.A.I.) submitted his

REPORT AS DELEGATE TO COMMITTEE OF CORRESPONDING SOCIETIES OF BRITISH ASSOCIATION.

Mr. Fennell said—The seventy-fourth meeting of the British Association for the Advancement of Science was held at Cambridge in August of this year, and I attended as a delegate from this Club to the Committee of Corresponding Societies.

The Cambridge meeting of the British Association had an attendance of about 2,700 members and associates, and the machinery of the Reception Committee was so miserably worked that hundreds were unable to obtain seats for the President's address, and consequently for the two public lectures, although Professors Darwin and Clark, seeing the state of affairs, and no doubt hearing the loud cry of dissatisfaction, kindly repeated their lectures. I had no local friend in Cambridge, and consequently could not obtain a seat, although a life member, a delegate, and a member of the General Committee; and if this course is again adopted it will become a question whether it is worth while attending—at least in an official capacity. I must, however, say that I felt no little satisfaction at hearing much appreciation expressed by many on the perfect arrangements that prevailed at the Belfast meeting in 1902, as well as for the good nature and courtesy of the Irish hosts. Many ladies and gentlemen, who were perfect strangers to me, stopped me to give expression to the pleasure they had derived from their Irish visit, and many asked me, if I had an opportunity, to thank the Belfast people on their behalf. That the Belfast meeting can be remembered with pleasure after two years is something that justifies a little pride.

On Thursday, 18th August, I attended the first meeting of Delegates, presided over by Principal Griffiths and Dr. Tempest Anderson as Vice-Chairman. The principal business of this meeting seemed to be a dismal wail that scientific

societies were not better represented; that the rules of admission should be changed; and that a greater interest should be exhibited. Judging from the numbers present I considered it a poor meeting, and my first impression as a Delegate was not a bright one. The names of the Delegates were published in the journal, and I could see that many did not attend at all, and some only for a few minutes, and I soon formed an opinion that there was "something rotten in the State of Denmark." To see a Delegate enter, write his name, shake hands with a few, and then run away, is very much like a melancholy farce. My advice is, never appoint anyone to any position unless he will promise to attend, work, and render an account of his stewardship.

Principal Griffiths opened the proceedings by reading a short paper, in which he said the present arrangement of allowing only the Societies which printed "Proceedings" to be represented should be kept, but extended to Societies which had museums, but did not publish. He seemed to think "Proceedings" a poor test, and his faint praise of them carried the usual condemnation, not to use the more emphatic word. He also proposed the establishment of a journal, commencing in a modest way, which might eventually be a source of much use. To meet this a tax of five shillings per fifty members, equal to about one penny farthing per member, could be imposed on Represented Societies. At this meeting the poor "Proceedings" seemed to come in for a large share of attention, which seemed to me much out of place.

A delegate from Hazelmore proposed that, as many Societies were strong in good workers, and did not waste money on "Proceedings," but applied it to work in the field, &c.—and had not even a museum—it would be better to send out Inspectors or Visitors from the British Association to all Scientific Societies and on their report to invite such societies to send in representatives. This was the most practical suggestion I heard. Eventually all these "suggestions" were sent forward to the Council.

The want of interest was not wholly confined to those who did not attend. I think the officials are much to blame, for Sir Norman Lockyer, the immediate Past-President of the Association, attended, and he said—and I took down his words—that during his term of office "no official representation or correspondence from the Committee came before him; this is not business but comic opera"; and he went on to say, that hard-working man as he was, he felt deeply hurt at the want of touch between the Committee and himself during his Presidency. He said "there was a great gulf between the head representatives and the *men who did the work*. As things go on at present, it is a terrible waste of time and energy. A change was wanted that would embrace the clubs that do not print reports." It was very evident by the way these remarks were received that Sir Norman carried the sympathy of the meeting with him.

The Committee passed on to the consideration of a paper by the Rev. W. Johnston, representing the Yorkshire Philosophical Society, suggesting the importance of utilising local museums in connection with elementary and other public schools; but it gave rise to no very animated discussion, although many points were worthy of attention, such as that every museum should have its lecture hall, and that specimens should be brought to the children there, instead of the children to the cases, where none but the few nearest the conductor could derive instruction. The Committee seemed to be restless, dwindling down, and inattentive, and as some garden parties were more attractive it adjourned.

On Tuesday, 23rd August, it reassembled, and the principal discussion seemed to be "that it was desirable to have a conformity of the publications of the societies with certain bibliographical requirements."

There was now a remarkable change in the spirit of the Committee—perhaps the garden party at Emmanuel College had done some good after all—and nothing could be too good for the "Proceedings," they were so very valuable that the members almost rose to enthusiasm over the somewhat

despised creature of yesterday, and the "Proceedings" had advanced so much in favour that it was necessary to bind all together, as they were invaluable works of reference. It seemed that the *Geographical Journal*, or the *Century Illustrated* was the size that met with most approval, and in the usual way "recommendations" were sent forward to the Council, and I suppose in future ages they will filter down to Belfast.

The Committee then sat to receive suggestions from the Sections of the British Association, and the result is decidedly instructive, and to my mind shows the high estimation in which the Committee of the Corresponding Societies is held by the British Association, viz:—

Section A.—Mathematical and Physical Science—A request for more numerous records of Meterological observations.

„ B.—Chemistry—No suggestion.

„ C.—Geology—Suggested, that all local names, and how these names came to be used, and what they mean, be sent up to the Secretary of the Association, who will forward them to the proper quarter.

„ D.—Zoology—A request to send up results of dredging in cave waters.

„ F.—Economic Science and Statistics—No suggestion.

„ G.—Engineering—No suggestion.

„ H.—Anthropology—No suggestion.

„ I.—Physiology—No suggestion.

„ K.—Botany—No suggestion.

„ L.—Education—No suggestion.

After this brilliant array of suggestions the Committee adjourned to meet again in South Africa.

The report was spoken to by Messrs. William Gray, M.R.I.A., and Robert Welch.

Afterwards Mr. Fennell proceeded to deliver the Presidential Address, the subject of which was

NOTES ON THE SLIGO CONFERENCE (JULY, 1904).

In the course of his remarks Mr. Fennell said—Anyone who has taken part in the Conferences of the Irish Field Club Union, since they first came into existence, will be inclined to agree with me that the idea of holding such Conferences was a good one, and has been abundantly justified by the results.

The fourth Triennial Conference was held this year at Sligo, and although the Official Report of same appeared in the "Irish Naturalist" for September it occurred to me that, as President of this Club, being bound to open the Winter Session with a Presidential Address, I might be allowed to shake off the purely scientific aspect of the Conference and its field work, and bring the more popular aspect of the time occupied before you.

The choice of Sligo for a visitation was a happy one, and to it, as well as to the arrangements, and the conducting of the party, our thanks are due to Mr. Robert Lloyd Praeger, who seems to have been born to be a leader and to whose vast scientific knowledge—ever and always at the disposal of any member—as well as to a genial good heart and a never ceasing courtesy to all, the Conference owes its great success; and Mr. Praeger's name will be long and gratefully remembered by every one of the sixty-two members who so cheerfully followed his standard.

The 12th of July saw Naturalists wending their way from Cork, Limerick, Dublin, and Belfast to Sligo, the Belfast contingent travelling through the historic associations of the twelfth in a diminishing ratio till Sligo was reached, where "not a drum was heard." I think I am correct in saying that every section of Field Club workers was well represented, and if the party was a miscellaneous one it also comprised a good working one, and the results tell their own tale in the Official Report.

Of course it goes without saying that nothing can be done, or ever was done in Ireland, without being immortalised in

song. We took our own bard with us, and if the songs she breathed were not of flowers, trees, and verdant woods (as we would expect from one so well versed in plant life), they were equally happy in the study of mankind as represented in the aforesaid party. To wit—

"Its members were gregarious,
Its ladies choice and various,
And all were most hilarious,
With intellects aglow.

There were many specialities amongst this varied crowd,
And I'd like to mention just a few, if I might be allowed—
There were plenty of Conchologists,
And many Archæologists,
And also Anthropologists,
With knowledge deep endowed.

Names of other specialities don't lend themselves to rhyme,
And I wouldn't dare to spell them, even if I had the time,
There was Botany, Geology,
Morphology, Zoology,
And assorted kinds of 'ology,
And every one was prime."

I most earnestly recommend our Club to create a section for poetry with this charming authoress as President.

Our arrival in Sligo was prompt, our housing was prompt, everything was prompt, the Conductor's whistle was also prompt, and at three o'clock he saw us all started on the first of a series of excursions—this being the half-day devoted to Rosses Point.

Rosses Point, as mentioned in our programme, "consists of a peninsula with a square end, which is occupied by a sandy beach buttressed with rocks at either extremity, and then hummocky rocky country formed partly of limestone and partly of mica-schist." Arriving at this peninsula with the square end we had the ever refreshing "afternoon tea," and then, ascending to an exceeding high place, Mr. Praeger pointed out the main features of the surrounding country, and our

various courses for the following days, which were well observable from this point. After which our party scattered, some to dredge the lakes and others to search the sand-dunes. Our sojourn here was short, and soon we were merrily on our way to dinner in our hotels. Afterwards we adjourned to the Town Hall, where a fine large room was placed at our disposal by the Mayor, and here the result of each collection was worked out. There was a good, busy "go" about the whole evening which was kept alive by the cheery ring of successful work.

On Tuesday, 13th July, our party started punctually at 9 o'clock for the first whole day's tour, and proceeded northwards for Lissadill and Raghly. Our first halt was about five miles north of Sligo at a place called Drumcliff, to inspect all that now remains of what must have been an important eccelsiastical establishment in the time of the Celtic Church in Ireland (known as *Tempul-boy*—the yellow church); to it was attached a college, frequented by foreigners, who came from far and near to imbibe knowledge at this celebrated school. "Drumcliff derives its name from a fleet of wicker boats (*cliabh currach*) fitted out there, with the object of plundering; and it is strange that after a lapse of two thousand years Drumcliff is still locally known for a trade in wicker work carried on in the village." (Col. Wood-Martin.)

Nothing of the original work of the early settlement now remains save the two crosses—the "stony sentinels"—and the stump of a round tower. Both these crosses are close beside the road, in the grounds of the modern church—one is a tall, ungainly stone-like work that was never finished, while the second ranks high in the order of merit in the Irish crosses, although we cannot place it in the first rank. It bears the characteristic interlacing designs which so distinguish Irish work, and whose development under the care of the early "Fathers" rose to the dignity of a national ornament. On each side of this cross, some few feet from its base, is a mortise hole—being evidence that it at one time possessed some attached feature, unusual in crosses, or at

least that it was intended to receive such. The cross is thirteen feet high, and three feet eight inches across the arms, and contains some scriptural subjects cut in relief, but in no case representing life did the Irish artists achieve perfection, or anything approaching it—that was reserved for a son of the nineteenth century, in the person of John Foley. The "Annals of the Four Masters" states that in 871 A.D., the lord of Carbury (a barony of Sligo) died, and was buried under "the hazel cross of Drumcliff."

The remnant of the round tower is interesting. It is only forty feet high, but may at one time have reached an altitude of one hundred feet. A time-honoured legend clings to this old tower—that when the wisest man passes it will fall on him and kill him. It is worth recording that all our party got safely past it. It is also worthy of mention that these monuments of the dawn of early Christianity all bear evidence of kindly care and protection in their old age. We wish we could say the same of all the other sacred stones of Ireland.

Passing on from here, we made for our rendezvous at the old fortified mansion (now a ruin) of Ardtermon—once the home of the Gore-Booth family. Fortified mansions were by no means uncommon in Ireland, and some of them remain as occupied dwellings to the present day. I believe I am correct in saying that the Waring's house at Waringstown, Co. Down, is one of these; and that there is the ruin of one at Whitehouse. The plan was simply to build with great strength in the form of a rectangle, and throw out bastions well loopholed so as to command all the exterior approaches, and the outer faces of the walls.

On our return journey a halt was called at Lissadill, the seat of Sir Jossyln Gore-Booth, Bart., and a pleasant hour or two was spent in the "veritable old-fashioned garden," which called forth more rapturous praise and genuine admiration than we ever heard bestowed on the prim attractions of the "carpet" gardens of the cultured age we live in.

Thursday, 14th July.—The morning proved rough, and

threatened rain. Our boats were soon full, and the men at the oars had a hard time pulling up stream against a strong head wind, so that the scenery of the river was not seen under the most favourable conditions. Not a little praise is due to the members of the party who took the oars and worked as if dear life depended on it, and we thankfully acknowledge that the success of the day was due to the hard work that they so willingly undertook. Some of our party preferred to take the road along the southern shore of the lake, and this gave them an opportunity of visiting a "holy well" in the woods. This well is still frequented for its curative powers, and many a humble token is left behind by those who in all sincerity believe that devout prayers beside it will be heard and answered.

Landing after various fortunes, a place of rendezvous was selected, and we climbed the Doonee Rock, commanding a magnificent view of an island-studded lake that runs Killarney very close in its beauty. The day cleared up, the sun came out and bathed the lake in sunlight, and for an hour or so favoured us with a look which seemed to say, "see how beautiful I am."

Lough Gill has its legends, like all other lakes, too long to quote in full, but I must mention it as Sligo claims initiative for two fabled queens. Manahan ("Son of the Ocean"), a chief of the Tualhade Donans, had nine daughters, one was called Gill. "She, from whom Lough Gill takes its name, is said to be seen often in the vicinity of the lake, over the waters of which she skims in her fleet rolling chariot. The White Shee, or Fairy Queen, has a well recognised pre-eminence over others of her sex and race, and it was probably owing to his familiarity with a tradition of this kind that Spenser drew materials for his Faerie Queen." (Wood-Martin.)

Not less than Spenser's are the following lines on the Maiden Gill, by a modern poet:—

"How clear that silvery mirror shone,
While many a glittering bark thereon,



Entrance into Lough Gill.

Spread white at morn her snowy sail,
Or wooed at eve the freshening gale,
Where many 'an isle of beauty' lay
Clad in verdant full array:
And o'er those waves from time unknown
Th' enchantress fair
Whose name they bear
Hath reigned on her crystal throne:
There her fleet chariot wheels of old
Over the glassy waters rolled.
And legends say the gentle maid,
In robes of purest white array'd,
And crowned with diadem of gold,
Still reins abreast three coal-black steeds,
Still on her car of triumph speeds,
In royal pride and radiant sheen,
Around her native valleys green,
And skims o'er the blue tide's surface cold."

Our proposed visit to Inismore or Church Island had to be abandoned, and as a result I can only briefly touch on it here. I was, however, by the kindness of Colonel Wood-Martin, able to visit the island before I left Sligo, and to investigate and survey what remains of the ancient ecclesiastical settlement. I place the plan of the church on the screen, as it is of interest in many ways, but especially on account of its possessing a room for a library and a pair of "squints"—a feature rarely found, but always insuring a large amount of interest. This church suffered severely from fire in 1416, but is now conserved under the Board of Works. The rest of the day was spent on the shores where good work was done, and after the usual cup of tea, the boats were again boarded, and the wind being in our favour our voyage home was quick, easy and pleasant.

Nine o'clock on Friday morning, 15th July, saw all the party once again well mounted and driving merrily along the well-kept roads north of the town of Sligo, and we soon approached the valley of Glencar, whose entrance seems to

be guarded by two mighty fortresses—one on either hand. These are the terminations of two ranges of mountains that wind away back from them. They possess what all mountains possess—a strange fascinating power, a strong attraction, that makes the eye wander constantly to them, rivetting the attention with their mighty magnitude and captivating one with the spell of their enchanted regions.

We are now in the great Carboniferous limestone district, and where one meets limestone one is sure to meet the marvellous in nature. Limestone is formed in water, and by water is transformed again. Its soluble nature renders it an easy material for the action of water to destroy or reconstruct. Geikie says that when a drop of rain falls it immediately commences its appointed geological task, and the multitude of drops, in an inconceivably vast multitude of ages, has worked gigantic transformations, and this action is still in operation, and will go on, slowly it may be but still surely, till the earth is divested of her verdure and her beauty, and like her satellite becomes decrepid, cold, and silent. However, she is now in the fullness of her life-bearing pleasure-giving age, and between these two great mountain ranges, these grand old works of God, she gives us the silvery placid waters of Glencar. Driving into the valley and skirting along the north shore of the lake, at the base of an almost perpendicular line of lofty cliffs rising to an altitude of over one thousand feet, we reach our rendezvous for the day in a small cove by the lake shore; we all dismount, and leaving our heavier wraps, etc., make for the waterfall of Glencar. The resulting action of the water on the limestone here is very noticeable in the cirque which it has cut. Falling water is always very attractive, and this was no exception, and immediately the cameras were in constant work on it. Our party now divided, and set to work till lunch time, many going out on the waters of the lough in a boat for aquatic flora and fauna.

Early in the day we were joined by the Rev. Joseph Meehan, C.C., of Drumkeeran. This gentleman is a member



[Photo. by Dr. G. Fogerty

Glencar.

Looking west from near the Waterfall.



[Photo. by C. Baker.

Glencar.

Looking west towards the Swiss Valley.

of the Congested Districts Board, and is an earnest worker for the agricultural advancement of his people, and the author and compiler of many valuable works on the subject. His presence amongst us was very welcome, and his fund of information, deep and profound, was readily at our disposal. From him we learned much about the local history—the legends of old times, the histories of later ones and the efforts to make the people grapple with the science of their work. If well-stocked, comfortable farmsteads, nestling in one of the beauty-spots of God's earth, owned, not tenanted, by well-clothed and hard-working people, are the results of such men's teaching, then, indeed, they are blessed beyond measure, and we bow to the man who has devoted a life to leading them onward. Father Meehan remained with us till evening, and we parted with many hopes of renewing our friendship and intercourse with him.

After lunch our guide conducted us up the side of the mountain through the wooded *talus* into the Swiss Valley. This slip is unseen from the road partly owing to the vegetation which has grown up, and partly to the natural perspective which hides the division. At this point our party divided, and the more venturesome took a track up the mountain, and returned by another path, meeting the main party at the head of the lake. Resuming our cars we journeyed home, arriving at the moment dinner was ready, after which we wound up the evening by a most enjoyable dance in the Town Hall, which, by the way, Mr. Praeger had forgotten to put in the programme.

Saturday, the 16th July, saw us in a region of wonders, a vast necropolis of a forgotten race of men, an area of gigantic monolithic memorials, so numerous, so mysterious in their rude dignity that were they a thousand miles distant instead of within our easy reach they would be preserved with care, and visited by thousands. This, however, applies to much more than these; for we hear the same story in every county in Ireland. The whole townland of Carrowmore seems studded with "an amazing wealth of stone monuments"

which tradition claims as the battlefield of the northern Moytura. In my opinion these are the works of an Age, not the erections following a battle. It is not in the nature of things that victors should pause after a conflict to raise memorials to the fallen—they had something else to do, like all victors—and these memorials would take time, trouble, and expense even now. We examined a number of these so-called "Druids' Altars," but the evidence they have yielded themselves plainly tells their true use as graves. Many call them "giants' graves," but the term giant can be fairly descriptive of exceptional intellect as well as of exceptional physical proportions. The words "giants' graves" give the cue to their purpose. All ages, all nations, both the cultured and the savage, have loved to honour their great men when they have passed away. We honour them even now—sometimes by a wretched so-called memorial costing some few pounds, collected in half-crowns from reluctant donors; but these men honoured their illustrious dead by manual labour beyond the power of estimation. Many of these monuments have vanished under the modern contractor's energy; one, perhaps the oldest, largest and best, whose inner vault was covered with stone like a cairn, and whose circumference was marked out with monolithic sentinels, was sold at eighteenpence a load, and considered while it lasted a valuable quarry, quite an asset on the estate. Many of our party entered the old vault, whose covering stone is ten feet square and two feet thick, weighing about fifteen tons. The last one of this series I give is the greatest of all, the reputed grave of Queen Meave, which crowns the lofty summit of Knocknarea, one thousand and seventy-eight feet above sea level, a fitting resting-place for our warrior Queen, and of whom Shakespeare weaved the thread into Mab, Queen of the Fairies, in the *Midsummer Night's Dream*. This cairn once had a circumference of six hundred and fifty feet and a height of eighty feet, but the quantities have diminished somewhat, as it was also useful as a quarry, but this enterprise has now ceased. The cairn has never, I believe, been opened, but it is sur-

rounded by some minor ones, which have yielded up evidences of human interments, and the rude ornaments and implements such as are usually associated with this Age. Who, then, were these people? This is the great debatable question, on which most antiquarians hold their own opinions. We often hear, when some rath or circle is under discussion, that it was the work of the Danes—a Danish fort. The Danes as we know them were not fort builders, and assuredly not permanent fortress constructors; they loved to plunder and be gone. That was a good breezy game and paid them better than settling down to cultivation as peace-abiding country gentlemen. We know that a race of people called the Firbolgs took possession of the country and ruled it, roughly estimated at about 1,000 years or so B.C. Perhaps they did not meet with resistance, but colonised the island and wanted to live peaceably, and did for some time, until a race of men known as the *Tuath-de-Danans* "landed at Murlough Bay on the coast of Antrim, and burnt their ships." They had come to stay. Soon the poor Firbolgs were conquered, and reduced to vassalage, and driven as far west as possible, where their descendants may still be traced. The Danans were war-like, and great builders, and from the Danans' fort to the Danes' fort is not a long cry, and must be considered when settling the question of the builders of Carrowmore.

The *Tuath-de-Danans* ruled the kingdom for two centuries, during which time it was called *Innis-fail*, the Isle of Destiny, so termed from *Lia-Fail*, the Stone of Destiny, which legend recounts they brought with them and held in highest veneration. The last monarch crowned on this stone was no less a person than the King of Great Britain and Ireland, His Majesty Edward VII. The *Tuath-de-Danans* were in turn conquered by the Milesians, the last of the "prehistoric" invaders, but it is said "the *Tuath-de-Danans* were great necromancers, skilled in all magic, and excellent in all the arts as builders, poets and musicians" (Berry), and as such they became instructors to their conquerors, "who gradually

were so fascinated and captivated by their gifts and power that they allowed them to remain and to build forts where they held high festival, with music and singing and the chant of bards" (Berry). To this blend then may be safely attributed the constructive genius and power of the great Stone Age, and if the morning of Ireland's life is only discernible by the forms of her sons moving like shadows, dim and uncertain in many respects, they are no less the shadows of men who have indeed left us a durable record in their work of the brave, fearless nature of their race, possessing, like every nation since—but painted in different colours—the inevitable law of growth, of grandeur, and decay.

Passing on from this region of wondrous work we visited Knocknarea Glen, described in the programme as "a remarkable straight cliff-walled fissure running along the mountain slope for the distance of a mile." To my mind this fissure, which is about fifty feet wide and bounded on each side by absolutely perpendicular cliffs of limestone, is due to an earth slip, like the Swiss Valley we spoke of. The interest is not confined to its geological formation, but equally, if not more so, to it as the most luxuriant home of the Hart's-tongue fern. We could have lingered longer here, but the guide's whistle again sounded, and our party divided, one section climbing to the summit of Knocknarea, crossing the mountain top and descending on the other side, there meeting the second portion at the village of Strandhill.

This village is on the shores of the Atlantic, and possesses a fine series of sand-dunes (like our local ones in Antrim and Down), which were soon the hunting-ground of the *Helix* collectors, and the popular explanations of Mr. Welch as he turned up a "rat run" and investigated the remains of a rat feast on luscious snails almost persuaded me to become a "snail man" too; and as I had nothing else to do I went out to the sand-blown valleys in the dunes and collected a lot of dried snail-shells, which seemed to me at least like the brilliant armour of many a lowly creature who had served his turn in this world and then passed on; for there is no

change even for a snail in the Divine law that creates and destroys. The rapture of the *Helix* men reached its highest point when Mr. Stelfox found a *Helix aspersa* with a reversed form of shell, that is a snail turned the wrong way—a malformation, a freak of nature—but it was a valued prize, and one the collector may be justly proud of. Assembling at the village we had our last afternoon tea, and returned to Sligo for dinner, after which some complimentary speeches brought the work of the Conference to a close.

The next day was Sunday, all the members being on that day free to take their own courses, and after devotional exercises they scattered, some to Ballysodare, where the waterfall was visited, others visited Ben Bulben, Lough Gill, and so on. The great Abbey of the Holy Cross came in for a fair share of attention. This Abbey is in the heart of the town, and like many another has been built well round. It dates from 1252, and presents many attractive features of 13th century work, as well as the domestic arrangements consequent on monastic life.

Monday, the 18th, witnessed our departure by train, after a ringing cheer for Mr. Praeger, who remained for further work. Most of us made a short halt at Enniskillen, and some of the party went from there to Clonmacnoise. At Enniskillen we were met by Mr. Thomas Plunkett, M.R.I.A., who is always very courteous and attentive to visitors from our Club.

Arriving at Belfast, the last of our friendly party separated, and the Sligo Conference had become a memory—a pleasant memory—of a week of unalloyed pleasure and field study.

The Lecture was illustrated with 80 specially prepared lime-light views, the lantern being manipulated by Mr. A. R. Hogg.

A letter from Mr. Thomas Plunkett, M.R.I.A., Enniskillen, thanking the members for electing him an honorary member of the Club, was read by the Secretary, and the election of Miss O'Neill, Miss May Ellis, and Mr. R. Allingham to membership, brought the proceedings to a close.

"A TALK ABOUT MOTHS."

The second meeting of the Winter Session was held in the Museum, College Square North, on 20th December, when there was a large attendance of members and friends. Previous to the meeting the usual "Science Gossip Half-hour" was occupied for informal discussion by members, when a white Water-Rail, recently shot in County Down, was exhibited by Mr. Robert Patterson, and sample of rhætic bone beds of Aust, Bristol, by Mr. Robert Bell. At eight o'clock the President (Mr. W. J. Fennell, M.R.I.A.I.) took the chair, and called on Rev. George Foster to read his paper. The title of the paper was "A Talk About Moths: the Life History of a Poplar Hawk Moth, as Told by Herself," and in Mr. Foster's treatment of the subject a female poplar hawk moth was represented as sitting one night towards the close of summer on the trunk of a willow tree—her usual hiding-place—and moralising upon her past life. By this means the attention of the audience was directed in a picturesque manner to the four metamorphoses or stages in the life-history of these insects. First, the egg set on the rough side of a willow leaf was described, and the dangers threatening the young germ of life therein were pointed out. The caterpillar and its various changes of skin as it grew to maturity next occupied attention, and its powers of attack and defence, and its innate mimicry of the leaves of the food plant, were set forth. Next was told the caterpillar's journey down the tree to bury itself in the ground, where the winter is spent in the chrysalis-case. Lastly, how the insect, with wings still folded and crushed up, left the case and made its way through the ground, up the trunk of its native tree, when its wings expanded, and at last the perfect insect took to flight and went forth to sip honey from the flowers, and to lay eggs on other willow or poplar trees. The poplar hawk moth and other moths born and bred on willow or poplar trees and reared by the writer were exhibited.

The paper was spoken to by Mr. John Hamilton.

"THE FEATHERED WORLD."

The second paper, entitled "The Feathered World," was read by Mr. Nevin H. Foster, M.B.O.U., who said—The Science of Palæontology teaches that the older the system of stratified rocks examined the lower in the scale of development will be found the fossils therein contained. In the geological period known as Triassic the highest order of animal life, so far revealed by its fossil remains, is reptilian; but in the succeeding Jurassic period is found the first indication of the development of bird life. The first fossil archæopteryx was discovered in the lithographic slate of Bavaria in 1861, and the slab is now in the British Museum. It reveals to us a bird differing widely from any known living species, the mouth being furnished with a fine set of true teeth, and the tail composed of a number of distinct *vertebræ*, of which each of the twelve posterior carried a pair of feathers, one on each side. A bird may be defined as a warm-blooded, two-legged, vertebrate animal, propagating its species by means of eggs, and whose body is clothed with feathers. This latter characteristic is confined altogether to birds, and no more suitable covering can be conceived of, possessing as it does lightness and warmth with flexibility and rigidity. The structure of feathers was then described, and special attention drawn to the manner in which the web or vane is bound together while still remaining perfectly porous. Modified feathers such as down, filo-plumes, and rictal bristles were also touched upon, as well as the crests or ruffles donned by some species at the beginning of the breeding season. As an instance of this, a picture of the little egret was thrown on the screen. This view showed the long tufts of filiform feathers assumed by this species, for which, to satisfy the caprice of feminine vanity, so many of these birds are ruthlessly slaughtered every year, and that, too, at a time when the death of the parent bird results in the starvation of the nestlings. Birds are divided into two sub-orders—the *ratitæ*, whose breast-bone is flat or raft-like, containing the kiwi, emu, rhea, cassowary, and ostrich—all flightless birds—and

the *carinatæ*, in which the sternum is furnished with a deep keel rising from its centre, and which provides a suitable attachment for the insertion of the powerful pectoral muscles, by means of which the bird is able to propel itself through the air. This latter sub-order contains the vast majority of known birds, but not all of them are able to fly—some having lost this power by disuse, and in consequence have, like the great auk, become extinct, or are liable, like the owl parrot of New Zealand, to extermination. Several of the more remarkable species of foreign birds were exhibited on the screen and attention was directed to their peculiar forms and habits, after which a large series of British birds and their nests was shown. Mr. Foster concluded his paper by an appeal to those present to protect our birds, while at the same time the study of birds in their native habitats was recommended, the only weapon necessary for this purpose being a good field-glass. To the young observer, he added—Do not be discouraged if you are unable to identify every bird seen; the best and quickest observers find themselves frequently at fault, but, with patience and application, it soon becomes easy, either by sight or sound, to distinguish the great majority of birds noticed in the course of our rambles. The paper was illustrated by upwards of fifty lime-light views.

Mr. Robert Patterson, F.Z.S., said that the skull of a mole had been found in Co. Derry, in the pellet of a bird of prey, and that, as this mammal was unknown in Ireland, he concluded that the bird had devoured the mole in Scotland and afterwards flown across to this country before disgorging the indigestible portions of its prey. Mr. Welch mentioned the protective colouring of the eggs of black-headed gulls, and the President expressed the pleasure with which he had listened to both the papers read that evening. The election of Messrs. T. Alfred Lowe, Ernest Green, and Joseph Boyce to membership concluded the proceedings.

"PLANT STRUCTURE AND ENVIRONMENT."

The third meeting of the Winter Session was held on 17th January in the Museum, College Square North, when a

large number of members and friends assembled to hear a paper entitled "Plant Structure and Environment" by Mr. G. H. Pethybridge, Ph.D., B.Sc., Demonstrator in Botany in the Royal College of Science for Ireland, Dublin. Dr. Pethybridge attended as a Delegate from the Dublin Naturalists' Field Club, in accordance with the scheme of the Irish Field Club Union, which provides for interchange of lecturers among the affiliated Field Clubs of Ireland, and he was awarded a cordial reception.

Prior to the meeting, at the usual "Science Gossip Half-hour" in the Clubroom, Mr. Robert Bell exhibited a fine crystal of quartz, and several interesting subjects were informally discussed. Punctually at eight o'clock the President (Mr. W. J. Fennell, M.R.I.A.I.) took the chair, and introduced the lecturer.

In the course of his remarks Dr. Pethybridge said that in taking a wide and comprehensive view over the realm of living things one could not but be struck by the remarkable diversity in form and structure presented both by animals and plants. A closer study revealed to the naturalist some forms which are relatively simple, and others which are complex; further study revealed striking gradation everywhere from the simple to the complex; and, finally, it was possible to arrange the organisms into groups, with similarities of structure, whether simple or complex, and so to arrive at a scheme of classification. The lecturer then briefly illustrated the principal groups in the classification of the vegetable kingdom, beginning with the simplest plant organisms, and pointed out the more striking peculiarities in the structure of the plants in each group. Having arrived at the most highly developed plants—those which produced flowers and seeds—the lecturer proceeded to discuss the organs of these plants and the life functions which they had to perform. Broadly speaking, the environment of a plant consisted of the soil in which its roots grew and the atmosphere which surrounded its aerial parts. It was pointed out that a plant's environment was, however, a complex thing, and could be ana-

lysed into a number of separate factors, each of which might be seen more or less clearly reflected in the structure of the plant organ affected by it. The general effect of alteration in structure directly produced by extreme alteration of environment was next illustrated by means of lantern slides of lowland plants which had been removed from their natural habitats and planted high up in the Alps, the changes thereby produced being very marked. He next proceeded to show the connection between some of the more important individual factors in plants' environment and the structure of the plant involved. Thus the effects of the presence or absence of water, light, warmth, wind, and the chemical nature of the soil were discussed and fully illustrated with photographs and diagrams on the screen. A number of slides were also shown of some of our common plants which live in such different habitats and under such various environmental conditions as those to be found on a seashore, in a bog, on a heather moor, &c., and the adaptations in structure for life under the conditions in each case were illustrated. Finally it was suggested that there was plenty of scope for field naturalists in studying more closely the habitats of plants and the plants themselves which were associated with such habitats. The distribution of such associations of plants could be studied and their limits recorded on the maps of particular districts, so that vegetation maps of the country could be produced, and thus our knowledge of the geography of plants largely increased.

The paper was illustrated by upwards of fifty lime-light views, and on its conclusion Rev. C. H. Waddell, B.D., and Professor Gregg Wilson, M.R.I.A., spoke to it.

The President called the attention of members to the Club-room Wednesday evenings, and hoped more of them would avail themselves of these opportunities for giving and receiving information, and announced that on the evening of Wednesday, 1st February, he would read a paper entitled "Half an Hour in Canterbury," and illustrate the same by a series of lime-light views.

Mr. R. S. Thompson having been elected a member, the proceedings terminated.

"EVOLUTION OF PLANT AS COMPARED WITH ANIMAL LIFE."

The weekly meeting of the Club was held on the 25th January. Mr. W. J. Fennell, M.R.I.A.I., presided, and Mr. Alex. Milligan delivered a short address on "The Evolution of Plant as compared with Animal Life." The speaker, after dealing with various definitions, proceeded to trace briefly the pedigree of some existing forms of plants and animals. In the protozoa, he believed, were to be found the common ancestors of both. After dealing with the unique power of chlorophyll—itself a form of protoplasm—to build up organic substance from inorganic matter, he pointed out that protozoa afforded several examples of organisms furnished with this chlorophyll, but which were considered too independent in structure to be classed as either animals or plants according to the ordinary conception of these terms. Nevertheless, he believed that certain environments which necessitated the continued functions of the chlorophyll in such organisms had led to its sole use in their nutrition. This, with the concomitant modification of structure which it involved, had led to the gradual development of true plant forms. Animal forms, he pointed out, must have been derived from forms of life not furnished with chlorophyll, and which were, therefore, dependent for sustenance on already existing organic matter—always the main characteristic of the animal kingdom. After touching upon the amazing faculty of selection and adaptation manifested by protoplasm, even in the simplest forms of life, the speaker concluded by alluding to the different character of the modifications of form and structure resulting from the fixed situation of the higher plants and their inorganic environment as compared with those resulting from the highly complex life and environment of animals; roughly indicating the lines on which plant and animal anatomy had developed.

"HALF AN HOUR IN CANTERBURY."

At the Wednesday evening meeting on 1st February the President (Mr. W. J. Fennell) read a paper entitled "Half an Hour in Canterbury," in which he described the pilgrimages to the famous shrine of Thomas à Becket, and briefly sketched the history of the church, which, with the single exception of Westminster, is more bound up in the history of England than any other cathedral. The life story of such a building must naturally contain many chapters of stirring events, and the mere mention of many of them brings vividly before one the great events of the building up of the nation. Alongside of this ran the progress of English art, as revealed in the Gothic stone, which bears a silent, but powerful testimony to the character of the men whose lives were concurrent with it. In little over "half an hour" Mr. Fennell took his audience round the grand old church, then through it, calling attention to the various styles of each well-marked age or period of its long lifetime. He pointed out the majesty of stupendous masses controlled by proportion and disposition, aided and dignified by appropriate ornament. He also called attention to the grotesque, and said that if the old monks were like other people and loved a witty jest, and even went so far as to carve it in stone as being too good to lose, they also had a serious side, which rose to the epic grandeur of spiritual power when it stood between the oppressor and the oppressed, with the command, "Stand back, son; thus far shalt thou go, but no farther." The paper was illustrated by fifty lime-light views, the last one being a view of the great church from the south-west, and in showing it he said that, in bringing the subject before the Club, even in this compressed form, he wished in some degree to show that, as a great critic has said, "Architecture is in its origin as essentially a useful art as weaving or ship-building, but almost alone of all her sister arts it is the one that has from various concurrent circumstances been refined into a fine art. When inspired by so lofty an aim as that of providing a house or temple worthy of the Deity, it became one of the noblest and most beautiful

of man's creations, but still essentially of human design in all its parts, and never striving to imitate nature except in copying as far as man's finite intelligence can do those perfect principles of design which pervade every natural production to be found wherever man's knowledge extends throughout the whole universe of God." Previous to the lecture Mr. Hanna exhibited a number of alien plants, and gave a very interesting description of same.

"TAXIDERMY."

On 8th February the usual weekly meeting of the Club was held in the Club-room at the Museum, College Square. The President (Mr. W. J. Fennell, M.R.I.A.I.) presided. Mr. W. A. Green gave a practical demonstration on the "Preservation of Birds," preceded by a short paper on the subject. In the course of his address he pointed out that primitive man must have had some idea of skin preservation, probably from a utilitarian rather than a scientific point of view, as was evidenced by the scrapers and rude flint tools of various kinds to be found on sites of early occupation. But one turned to the ancient Egyptians for the first suggestion of preserving an animal with any idea of retaining its natural proportions. This was the process of embalming, and examples both of human subjects and of the lower animals can be seen in any of our museums. The art of taxidermy began to be practised in England towards the end of the 17th century, as is proved by the Sloane collection, which in 1725 formed the nucleus of the natural history collection now lodged in the galleries at South Kensington. Davies tells us, however, that an attempt to stuff birds was made by the Hollanders early in the 16th century. The birds were skinned, and the skins filled with "spices of the Indies" for their preservation, after which they were wired and mounted to represent life. The lecturer then pointed out the high degree of excellence attained in the present day, and referred to Mr. Sheals, who, if he be equalled, was, in the lecturer's opinion, certainly not sur-

passed in the art of taxidermy in the three kingdoms. Naturalists are born, not made, and this is a profession that does not adapt itself to "pot boiling," but requires a careful study of the habits of the living creature. He then briefly explained the simplest method of setting up a bird, and various *formulæ* of preservative preparations for the skins, after which the demonstration was proceeded with.

"SEA ANEMONES."

Mr. W. J. Fennell, M.R.I.A.I., presided at the usual Wednesday night meeting of the Society, held in the Museum, College Square, on 15th February. A paper was read by Mr. W. H. Gallway, on "Sea Anemones: their Structure, Habits, and Life History." Mr. Gallway referred in brief terms to the great antiquity of this group of animals, which can be traced back for millions of years, from the remote Silurian period to the present. He showed that what are commonly known as corals were merely the skeletons of animals of the same family as the sea anemones. The structure of the anemones was very curious, and not at all so simple as one would imagine, judging from their outward appearance, the animal taking the form of a soft, fleshy column, the interior of which column was partitioned off into cells, the cells communicating directly with the *tentaculæ*. The whole interior of the animal being richly ciliated caused a constant circulation of the fluids to all parts, the contraction and expansion of the creature being effected by two layers of muscular tissue, the outer composed of transverse, the inner of longitudinal, fibres. Certain species of anemones possessed a most remarkable weapon, consisting of a thread-like filament, which could be ejected from cells embedded in the fleshy column. This filament could be seen with the naked eye, and under the microscope one could find its surface crowded with cells, which again eject barbed weapons containing a poison. The animal shoots this weapon into its victim, and, not being able to withdraw it again, the barbs

are left in the wound with the poison covering them, which soon causes torpor and death. The habit of this creature was to cling by its base to the rocks, and, expanding the tentacles, wait for any passing fish or crab to touch them. When this took place the fish was immediately enveloped in the tentacles and forced down into the stomach, the latter consisting of a short flattened sac communicating directly with the mouth. The *Anthea cereus* divides itself longitudinally from the disk downwards, thus forming two distinct animals. The lecture was illustrated by diagrams.

"OBSERVATIONS ON OUR HOME HILLS."

The fourth meeting of the Winter Session of the Society was held in the Museum on 21st February, and was attended by a large number of members and friends. Previous to the meeting half an hour was devoted to the informal "Science Gossip," at which a specimen of the tree-frog was exhibited by Mr. W. A. Green. At eight o'clock the President (Mr. W. J. Fennell, M.R.I.A.I.) took the chair, and called on Mr. Robert Bell to read the first paper, entitled "Observations on Our Home Hills." Mr. Bell said:—Probably no area within the three kingdoms of such limited extent as the hills in our vicinity exhibited so many formations worthy of the attention of the geological student. Almost all the rocks yielded fossils, and rock exposures were frequent and easily accessible along the hillsides. The picturesque range of mountains that overlooked Belfast was crowned with Tertiary basalt. Underneath were the Mesozoic rocks, the only rocks of that period now found in Ireland, and therefore of considerable interest. The Mesozoic rocks consisted of the following formations in ascending order:—Triassic sandstone, Lower Lias, and Upper Cretaceous. The Trias was divided into the Bunter and Keuper series. Bunter sandstones might be observed at Fortwilliam Park and Skegoniel Avenue. Keuper clays were to be seen in some brickfields on the Springfield Road, and attained a thickness of 800 feet. The

Triassic deposits of our district were devoid of fossil remains. Above the Trias were found the Rhætic beds from which the following fossils had been collected:—*Avicula contorta*, *Modiola minima*, and *Pecten valoniensis*. Liassic rocks were found on the southern side of Cavehill, the best exposures being in the bed of Carr's Glen, where the beds belong to the *Ammonites planorbis* zone—the lowest of the ammonite zones of the Lower Lias. From this zone he had obtained the following fossils:—Vertebræ of *Ichthyosaurus*, *Ammonites planorbis*, *Cardinia ovalis*, *Lima pectenoides*, *Ostrea liassica*, and *Pseudodiadema lobatum* (Wright). This last-named fossil was new to our district, and had first been recorded by the lecturer. The Upper Cretaceous rocks showed great variety of composition and yielded many fossil remains. Some of his finds proved records for the first time—namely, *Ostrea diluviana* from the yellow sands and *Belemnitella quadrata* from the nodular band. The Cretaceous beds here exposed showed five divisions, each marked by special lithological and palæontological features. Their ascending order of sequence was—1st, Glauconitic sands; 2nd, Yellow sands; 3rd, Chloritic sands and sandstones; 4th, Chloritic chalk, the basement bed of the overlying No. 5—the White chalk. Mr. Bell described these beds in detail, and exhibited many fossils which he had collected therefrom. Proceeding, the speaker described how he found for the first time a "flint factory" on the side of Squire's Hill. Subsequent searches proved the existence of similar manufactories at Crow Glen and above Wolfhill, instances which had not been recorded before.

The President, Messrs. W. Gray, M.R.I.A., R. Welch, C. M. Cunningham, L.D.S., and W. J. C. Tomlinson took part in the discussion which followed.

"ORIGIN AND GROWTH OF AGATE AND CHALCEDONY."

The second paper, "The Origin and Growth of Agate and Chalcedony," was read by Mr. J. Strachan, who said:—The prettily banded and coloured siliceous stones called

agates, or Scotch pebbles, were found all over the world on sea-beaches and in river-beds, as water-worn pebbles. In Ireland they were found on the South Coast, in County Wicklow, and more rarely near the Giant's Causeway. In Scotland and in Germany they occurred also in their mother-rock, which was generally an andesitic lava. Here the agates occurred in steam cavities, once empty, but now filled with agate, which had been deposited therein from an aqueous solution of silica percolating the lava. Hence the embedded agates and their banded structures preserved the contour of the steam-bubbles, imprisoned at one time in their upward ascent through the molten and boiling rock, as the latter congealed into a solid. Agate, according to the mineralogist, was a variegated chalcedony presenting many variations in colour and structure. Each distinct variation gave rise to a class-name such as "moss-agate," "eyed-agate," "onyx," "sard," "carnelian," &c. The variety in colour was a point easily settled by chemical analysis, and it has been found that iron, manganese, and titanium oxides were the chief colouring agents in agate. The variety of structure displayed by the concentric bands of an agate and its abnormal growths presented difficulties, some of which were yet unsettled. Many years ago the German geologists discussed the question of agate-genesis very fully, and many of them came to the conclusion that agates had been deposited from a hot solution of silica traversing the mother rock shortly after its consolidation from a liquid state. Noggerath, of Bonn, stated that the siliceous solutions entered at isolated points in the sides of the cavities; these he called "agate-tubes." Haidinger, on the other hand, was of the opinion that the solutions were secreted from all over the cavity-walls, and that the tubes were really "tubes of escape." Ruskin was the first geologist who studied the question of agate-growth very deeply. He pointed out that agate was really a crystalline growth deposited from a hot solution of silica. He showed also that two opposing forces of crystallisation were at work, one tending to build up hexagonal crystals and the other spherical

concretions of quartz. Herein lay the secret of crystal-growth, which was yet a mystery. The agate-tubes were also a mystery to him; he called them "tubes," or "points of arrest." The late Dr. Heddle, of St. Andrews, contributed much to our exact knowledge of agate-structure. He examined several thousands of agate-sections, and, after much study, came to the conclusion that agates were derived from the decomposition of the mother-rock by the percolation of meteoric waters (cold) containing carbonic and humic acids which had the power to decompose the rock-forming silicates with formation of free silica. The question of the geological age of agates was still unsettled. Undoubtedly agates bore the same relations to the basic mother-rock as the zeolitic minerals did to their mother-basalt, and if the zeolites had been secreted from hot solutions, so also had agates. There was also undoubtedly a law governing the order of deposition of the minerals in an agate-cavity, and this law was almost identical with that governing the order of crystallisation of the minerals in the mother-rock.

Mr. W. Gray and Mr. R. Welch criticised the paper.

Both papers were fully illustrated by lime-light views, the lantern being in charge of Mr. A. R. Hogg. Afterwards the members came forward to the table, where Messrs. Bell and Strachan had a large series of specimens, to which they had referred in their papers, and these were examined with great interest. The election to membership of Messrs. William Greenhill, Samuel Sinclair, and W. J. Porritt brought the proceedings to a close.

"SHARKS' TEETH FROM LOCAL CRETACEOUS FORMATIONS."

The Wednesday evening meeting of the Club was held in the Museum, College Square, on 22nd February—the President (Mr. W. J. Fennell, M.R.I.A.I.) presiding—when Mr. Robert Bell read a paper on "Sharks' Teeth from the Local Cretaceous Formations," in which he said:—The specific determination of the detached teeth of sharks is little more than

guesswork, and to decide upon their generic relationship with any approach to certainty is also often very difficult. The teeth vary so much in form and proportions in different parts of the mouth, and some well-defined *genera* and *species* differ so little from one another in their dentition, that a scientific nomenclature is sometimes quite impossible. Such teeth form part of the fauna of our Cretaceous rocks. The fish remains recorded by Mr. R. Bell consist of teeth of the families *Lamnidæ* and *Myliobatidæ*. The *Lamnidæ* are represented in our Cretaceous formations by four *genera*:—1st *genus Scapanorhynchus—Scapanorhynchus raphiodon, Inoceramus crispi-band,* from Chloritic sands, Woodburn Glen; *Scapanorhynchus gigas, Rhynchonella robusta-band,* from Chloritic sandstone, Kilcoan. 2nd *genus Oxyrhina—Oxyrhina angustidens, Exogyra columba-band,* from Chloritic Sands, Colin Glen. 3rd *genus—Lamna appendiculata, Rhynchonella robusta-band,* from Chloritic sands, Waterloo, Larne. 4th *genus Corax—Corax falcatus, Inoceramus crispi-band,* from Chloritic sands, Squire's Hill; *Corax affinis,* from Spongarian band, Chloritic sands, Kilcoan. The family *Myliobatidæ*—The following species of the genus *Ptychodus* were recorded also by Mr. Bell:—*Ptychodus decurrens, Inoceramus crispi-band,* from Chloritic sands, Hillsport; *Ptychodus mammillaris,* from Nodular-band, Chloritic chalk, Squire's Hill; *Ptychodus latissimus,* from Spongarian band, Chloritic sandstones, Hillsport. Teeth form most important guides to the naturalist in the classification of animals, and their value is enhanced by the facility with which, from their position, they can be examined in living or recent animals; whilst the durability of their tissues renders them not less available to the palæontologist in the determination of the natural affinities of extinct species, of whose organisation they are often the sole remains discoverable in the deposits of former periods of the earth's history. Mr. Bell exhibited a number of exceedingly fine examples of Cretaceous fossils which he had collected himself along our local Antrim hills. The paper was listened to with great interest and followed by a brisk discussion.

"CARRICKFERGUS SALT BEDS."

The weekly meeting was held on 1st March—Mr. Robert Patterson, F.Z.S., M.R.I.A., Vice-President, in the chair. Mr. George E. Reilly read a paper entitled "The Carrickfergus Salt Beds." He pointed out that the existence of salt in this district was unknown till the year 1845, when the Marquis of Downshire, in searching for coal, found the deposits of salt at a depth of 550 ft. Mines were opened near Duncrue, and are still working. Other sinkings have been made, all within a distance of about two miles, and salt found in some places. Volcanic energy may account for the displacement of the marl beds, in which the salt always occurs. Carrickfergus Castle itself sits on an intrusive dyke of basalt, which can be traced some miles inland. Another such dyke crops out on the beach at Boneybefore. Rock salt is found at different depths, from 300 feet to 1,000 feet, below the surface of the ground, sometimes in one, two, or three seams, varying in thickness from 12 feet to 100 feet. These seams are interspaced by bands of blue and red marl, more or less mixed with salt. The lecturer expressed his indebtedness to the managers of the various mining companies and to the mine officials for opportunities of investigation for information freely placed at the disposal of the Field Club. Exhibits of various classes of rock salt and the marls in which they occur were made; also sections of the workings and photographs taken in the mines by flashlight by Mr. A. R. Hogg. An interesting and instructive discussion followed Mr. Reilly's paper.

"DEEP SEA LIFE."

The usual weekly meeting was held in the Club-room on 8th March—the Vice-President (Mr. Robert Patterson, M.R.I.A.) in the chair. Professor Gregg Wilson, D.Sc., gave a lecture on "Deep Sea Life," and there was a good attendance of members.

Dr. Wilson called attention to the fact that a very large part of the sea is deep, the great ocean basins varying from

about two miles in depth to the extreme limit of five and a half miles. Our fishing area is a mere shelf on the margin of the Atlantic basin, and the transition from the shallow waters near our coasts to the great depths is very sudden. Till recently next to nothing was known of the depths of the sea, but the Challenger expedition, under the late Sir Wyville Thompson, added greatly to our knowledge, and numerous later investigations have further extended it. There were many difficulties encountered by the first explorers of the abysses, but these have gradually been overcome, and now it is possible to use even such large apparatus as a fifty-foot otter-trawl at depths of more than a mile. Special apparatus has been devised for obtaining samples of the bottom and samples of water, as well as for the capture of specimens of the organisms that live at various depths. For a time there was a controversy as to whether the animals brought up in the bottom nets were not largely caught during the hauling up of the nets; but doubts on this subject have been set at rest by "closing nets" that are arranged to work at given depths, and are then closed. Investigations show that the bottom waters of our oceans are cold, varying little in temperature from year to year, and that they are dark, and that the pressure exercised by the superincumbent waters is enormous. This last fact is of importance, as it implies that migration is greatly restricted by the pressure, and it is of special interest to the zoologist, as it explains why he so rarely gets a perfect fish from the bottom of the ocean; usually the parts are greatly strained as the result of the release of pressure. It may be asked, How do animals live in such environment? There are no plants living there on which the animals may feed, so that all life is dependent on what may fall from above. But even so, it is difficult at first to realise how food is found. Some fishes adopt what has been called a "masterly policy of inactivity," and wait for food to enter their mouths. Others seem to depend on luminous organs to enable them to find their prey, and certain of these forms are of special interest, because they are related to common shore

forms. Other deep-sea animals, including fishes, depend on long feelers for recognition of food, and many are probably able to find their victims by smell. This is indicated by the occurrence of blind forms in which feelers are not specially developed, and it is the more credible, as we know that many of our shore forms have the same capacity. While offensive apparatus is thus developed to suit the conditions, defensive modifications are also apparent. Thus many fishes are black to escape observation, and almost all crabs and their relatives are red. The redness is undoubtedly a protection, as in the peculiarly filtered light of moderate depths it is even less conspicuous than black. There are thus many instructive modifications of the organisms of the deep sea, and these undoubtedly help us to appreciate the meaning of what we see every day around us.

At the close of the lecture, which was illustrated by many lantern views, an interesting discussion took place.

"EGGS OF IRISH BREEDING BIRDS."

The weekly meeting was held in the Club-room on 15th March—the President (Mr. W. J. Fennell) presiding. Mr. N. H. Foster, M.B.O.U., gave a demonstration on "The Eggs of Irish Breeding Birds." In the course of his remarks Mr. Foster said that 290 species of birds were admitted to the Irish list, and of these 135 species breed, or have bred in Ireland within the past century. It was doubtful if any golden eagles, marsh-harriers, or hen-harriers breed here at the present day, though in the middle of the last century nests of these species were by no means rare in this country; while the goldfinch, at one time locally common in Down and Antrim, was now very rare, if not altogether extinct in a state of nature in these counties. Two causes probably contributed to the extinction of this bird from our local *avifauna* —improved methods of agriculture, whereby the birds were largely deprived of their favourite feeding seeds of thistle, ragwort, knapweed, &c., and the attentions of the bird-

catcher. On the other hand, some species had decidedly increased as breeders within recent years, as, for example, the starling, tufted duck, and stock-dove. In 1891 the red-necked phalarope was accorded a place on the Irish list on the strength of a solitary example obtained in County Armagh, but in 1902 this species was reported as breeding in the West of Ireland; and he had been informed by a gentleman who had visited the locality last year that there were then at least 30 pairs breeding. Wisely, this locality had so far been kept secret. It had been asserted more than once that the wigeon breeds in Ireland, but, although this may possibly be correct, these occurrences have never been authenticated. Mr. Foster exhibited eggs of all birds known to breed in Ireland, and going through the list, order by order and family by family, he directed attention to the variation in shape, size, and colour of the eggs, and explained the habits of nidification obtaining in the different species. The collection of eggs was examined with much interest by the members present, and an animated discussion ensued, in which Messrs. W. J. Fennell, Robert Patterson, H. L. Orr, G. E. Reilly, S. M. Stears, etc., participated.

HONOURS TO MEMBERS.

The fifth meeting of the Winter Session was held in the Museum on Tuesday, 21st March. Mr. W. J. Fennell, M.R.I.A., presided, and there was an exceptionally large attendance of members and friends. During the "Science Gossip Half-hour" before the meeting Mr. Thomas Anderson exhibited a fine collection of minerals. Previous to the regular business, Mr. Robert Patterson, F.Z.S., announced that the Club had been highly honoured last week by the election of three of its members into the Royal Irish Academy, and moved the following resolution:—"That the hearty congratulations of the Club be conveyed to our fellow-members, Major Berry, Messrs. W. J. Fennell, and R. Welch, who have had the distinguished honour of being elected members of the

Royal Irish Academy." The motion was seconded by Mr. N. H. Foster, M.B.O.U., and carried by acclamation. Mr. Patterson said that twenty-five members of the Field Club had embraced the opportunity of showing their appreciation of Mr. Welch's many services to the Club, by uniting to present him with a Life Membership Certificate, thus constituting him a member of the Royal Irish Academy for life without any expense to himself. The announcement was received with applause, and Mr. Welch was handed his certificate.

"FORESTS, WILD AND CULTIVATED."

The President then introduced Mr. Augustine Henry, M.A., F.L.S., L.R.C.P.(Ed.), who read a paper entitled "Forests, Wild and Cultivated."

The lecturer began by referring to the ways in which the natural forests had been destroyed by human agency, and the difficulty with which when once cut down they regenerated themselves in many regions. In tropical countries rank grasses took possession of the soil, and seedling trees had much in consequence to contend with. In the cold, temperate regions the growth of heather and peat-moss replaced the ancient forests in many places. Most of our peat bogs were simply ruined forests. Of primeval forests in Ireland only a few small woods remained, of which the most remarkable was the arbutus "formation" at Killarney, which was unique, as nowhere else did the arbutus attain the size of and function as a forest tree, rivalling in height and girth the oak, holly, &c., which mixed with it. In France and Mediterranean countries generally the arbutus was only an undershrub, dominated by large trees in the forest. Here and there in Ireland bits of oak forest occurred, which were primitive, and in them peculiar land-shells occurred, which were absent from places where there had ever been any farm cultivation. A view of a beautiful alder wood in Wicklow was shown, which apparently was also primeval—*i.e.*, the trees had never been planted, and those now growing were occupying the swampy

side of the mountain over a considerable area. The ancient pine forest had utterly disappeared in Ireland, and could only be seen in the British Isles in two or three localities in Scotland; and some idea of its nature could be formed from a slide giving a view of the pine forest at Ballochbuie, near Balmoral. Mr. Henry then entered into the causes underlying the division of the earth's surface into woodland, grassland, and desert. The broad generalisation could be made that the amount of rainfall was the determining factor. Where the rainfall was scanty the desert condition prevailed. Trees required immense quantities of water to replace what they transpired into air, and, being deep-rooting plants, they found it in the subsoil in all localities where the rainfall was considerable, and there they ousted the grass. The greater the rainfall the denser the forest and the taller the trees. Soil was a subsidiary factor; the rainfall determined the existence of the forest, the soil determined the kind of tree. In Southern Russia, in the most fertile soil, now devoted to wheat cultivation, no trees occurred; there were formerly only the grassy steppes. The cause was the small rainfall—less than 20 inches Cold in itself was not the cause of absence of tree growth. The northern pole of cold is located in the Siberian forest. Cold drying winds in winter put a stop, however, to tree growth, as trees then transpiring water could not replace it from the frozen ground, and died of drought. On the higher parts of lofty mountains dryness and not cold was the cause of the absence of trees. Ireland had an ideal forest climate, there being a heavy rainfall, and in winter a mild temperature, with an absence of cold drying winds. In ancient times the forests of Ireland were very luxuriant, and evidence of this was forthcoming in various ways—historical records, remains of peat mosses, submerged coast forests, &c. Trees grew astonishingly well in Ireland at the present day. The lecturer showed slides of remarkable trees in different parts of Ireland—the tallest ash, which reaches 130 feet in height, in Kilkenny; the biggest chestnut, in Wicklow; great silver firs, &c. What was more remark-

able, there were examples in Ireland of exotic trees finer than they were known to occur in their native homes—*e.g.*, the tallest *quercus ilex* is probably one in Wicklow; it seems to be higher than any recorded in the Mediterranean region. The biggest hornbeam in Europe occurs at Killarney. Slides of these were shown, and also of a *pinus insignis* at Muckross, which had reached 98 feet in height (with great girth) in fifty years of growth. Remarkable instances also occurred at Powerscourt, and the beauty, luxuriance, and variety at Castlewellan were well known. Fota, near Queenstown, with its palms, Mexican conifers, &c., all growing beautifully in the open air, showed the almost sub-tropical condition of our climate. It seems also to be agreed that the most beautiful garden in Europe is that of Mr. Walpole at Mount Usher, in Wicklow, and no botanic garden could rival in variety of trees and shrubs the famous property of Mr. Thomas Acton at Kilmacurragh, also in Wicklow. The lecturer showed slides illustrating difference of branching in trees of temperate and tropical regions, and also of trees tolerant and intolerant of shade, the latter being the distinction most important to the forests. Passing on to the subject of cultivated forests, he showed how different these were from wild forests, in the fact that only certain trees were cultivated, and the form of the tree aimed at was the one without branching, giving tall, straight, perfect timber. Slides illustrated the difference between the dense forests of the Continent, of considerable area, closed in from the action of the sun or wind on the soil, and the imperfect narrow belts and open plantations so often seen in this country, where the soil was necessarily in a bad condition. Slides were also shown of the Scalp in County Dublin, which illustrated the way in which the forest in a moist climate takes possession of even bare rock. On the Continent waste land was afforested—*i.e.*, land unsuitable for grazing or agriculture should bear trees as a crop—and soil was of little or no importance in this question. The possibility of re-afforestation of our boglands and bare mountain sides was then examined. Trees had formerly grown in peat

mosses, as witness the stumps of pines in our bogs. They could grow again. Instances were mentioned of wonderful growth of trees in deep peat mosses—*e.g.*, an alder 95 feet high at Church Hill, in County Armagh; larch in Welsh peat bogs, &c. The conditions of successful plantations on bogs were delicate, apparently depending on moderate drainage. That trees could grow and forests be created in Ireland on the waste lands was a fact. The real difficulty lay in obtaining possession of the land in large enough blocks and in careful study of the conditions essential to success. The lecturer explained the action of the Belgian Government in the matter, and he advocated some system analogous to that of the communal ownership of forests on the Continent. The remarkable prosperity of forest regions from the rise of many subsidiary industries was then dealt with. The lecturer concluded by showing a series of slides illustrative of growth of trees at different altitudes and on different soils, from which it appeared that each species had its own peculiar idiosyncrasy. The lecturer referred to the benefits which would accrue by planting trees in the waste places of a country such as Ireland. Timber would undoubtedly increase in value, and not only so, but industries would spring up which would tend to the prosperity and welfare of the country. He also referred to certain points on which information was wanting in our knowledge of trees in this country—as, *e.g.*, the distribution of the two species of oak, the peculiarities of the two kinds of birch, the investigation of the ancient forests in the peat bogs, &c. The members of the Field Club could be of great service in obtaining such information. The lecture was illustrated by lime-light views from photos taken by the lecturer.

In speaking to the paper, Mr. R. Welch, M.R.I.A., pointed out how the remnants of the old forest growth in Ireland, in waste ground on rough glen sides, and on the islands in the greater lakes, such as Lough Erne, Lough Derg, &c., had formed sanctuaries for much of the old fauna of the country. Many rare land-shells were found in them,

not otherwise obtainable. The same applies to insect life, of which Clonbrock forest and the little rough glens in the Vale of Glenshesk afford good examples.

Mr. W. H. Patterson, M.R.I.A., said, as regards waste land in Ireland, he thought in their own vicinity foresting experiments might be made on such places as Black Mountain, Divis, Squire's Hill, and Cave Hill. Scotch fir, spruce, larch, and other ordinary trees might be grown. The speaker also referred to the dug-out boglands between Ballymena and Ballycastle, where experiments might be conducted.

The President stated there was a great market in Belfast for the sale of timber, and foresting might accordingly be turned into a profitable enterprise.

Mr. R. Young, jun., said the growth of beech trees in Buckinghamshire was associated there with an important industry, and there was in his opinion no reason why in Ireland a similar enterprise could not be set on foot.

A member of the audience asked the lecturer what kind of trees were best suited to peat bogs.

The President, in moving a vote of thanks to the lecturer, said he had brought before them many subjects connected with the regeneration of Ireland. There seemed to be great possibilities along the lines which he had indicated, and if his suggestions were taken advantage of he thought a good deal of benefit would result therefrom.

Mr. F. J. Bigger, M.R.I.A., in seconding, said he was sure they had all enjoyed what Mr .Henry had said, and that they had been delighted particularly with the scenes illustrating practically the forests of the world. The observations made by Mr. Henry in regard to the reafforesting of Ireland were extremely to the point. It was time effort was made in this direction. He was sure when the lecturer's great work did appear, it would give a stimulus to that question, and possibly some active steps might be taken either by the Department of Agriculture or some other such body to institute an active interest in the cultivation of the waste places in the mountains and bogs of Ireland.

The resolution was passed enthusiastically.

The lecturer, in replying, said it was a great pleasure to him, as a wanderer everywhere, to come back, so to speak, home again and see the faces of old fellow-students, and he believed the face of his old schoolmaster. He had thrown out those suggestions as the sort of thing that the Field Club might take up. Botanists, he thought, were not doing the study of trees justice. Every dandelion elucidated for itself an amount of enthusiasm which was astonishing. If he tried to inquire what was the species of oak which was native to the country, what was their distribution, he got practically no answer to the question, and geologists gave him very little information as to ancient forests. Dealing with the question as to peat bogs, the lecturer instanced the Sitka spruce and other trees, in the planting of which successful experiments had been made.

The President mentioned that a new Field Club had been started in Tyrone, and was sure the members of the Belfast Field Club would do all in their power to further the success of the new organisation. He also had to report that Mr. A. R. Hogg had presented to the Club a large flash-light photograph showing the roof of one of the Carrickfergus Salt Mines with the men at work in one of the upper galleries, and on behalf of the Club he thanked Mr. Hogg for this gift, which now adorns the wall of the Club-room.

The election of Miss M. Sinclair, Messrs. Arthur Deane, John M'Dowell, W. H. Robinson, Stewart Faussett, and James M'Whirter to membership brought the proceedings to a close.

"MARINE SHELLS OF OUR DISTRICT."

The usual weekly meeting of the Club was held in the Club-room, Museum, on 22nd March—the President (Mr. W. J. Fennell, M.R.I.A.) in the chair. Mr. George Donaldson read a paper on the "Marine Shells of our District." He began by remarking how little progress we are making in our study of marine zoology since the days of Thompson,

Hyndman, and Patterson. These three indefatigable workers left records of 391 species of shells, both living and dead, found by them in our waters.. He then pointed out the position of the mollusca in the animal kingdom, and divided them into their orders, according to their well-known characters, after which he referred to each family of the orders inhabiting our local waters, and pointed out their well-marked and easily-recognised differences, enumerating all the species. Mr. Donaldson's lecture was well attended, and the discussion which followed showed the subject to be still full of interest. The lecturer illustrated his remarks by a large array of specimens kindly lent by the Museum authorities for the purpose.

"GEOLOGICAL PHOTOGRAPHS."

On 29th March the concluding weekly meeting of the Winter Session was held in the Club-room at the Museum in College Square—the President, Mr. W. J. Fennell, M R.I.A., presiding. There was a large attendance, due to the attractiveness of the subject announced and the popularity of the lecturer, Mr. R. Welch, M.R.I.A., who chose for his subject the new drift survey of the Dublin, Belfast, and Cork areas, with special reference to the photographs taken to illustrate the geological memoirs which describe the areas mapped. The old memoirs were illustrated merely by rough woodcuts, helped out by line blocks. In the new memoirs carefully printed half-tone blocks from photographs are used instead. All the photographs taken were exhibited, and the more interesting ones in each area pointed out. Among these were the dry gap in the Dublin Hills known as Dingle, a puzzling ravine, which seems to have been formed during the melting of the ice in late glacial times, the sections in the Greenhills esker, and the crushed slates at Howth Head; in the Belfast area, sections in the deposits of the ancient Lake Belfast were shown, and the volcanic sills at Scrabo Hill; in Cork, those curious submerged pre-glacial river gorges, which cut across the old red sandstone ridges and the pre-glacial raised

beach, so well described and illustrated by Messrs. Wright and Muff, of the Geological Survey, in their recent paper at the Royal Dublin Society. This was also exhibited with their map and photographs. Some recent geological work in other parts of Ireland was also mentioned and partly illustrated. The lecture was followed by a good discussion.

The Forty-second Annual Meeting was held in the Museum, College Square North, on 11th April—the President (Mr. W. J. Fennell, M.R.I.A.) in the chair. There was a large attendance of members, and previous to the reception of reports and election of office-bearers for 1905-6 two short papers were read, and the President announced that Mr. R. Welch, M.R.I.A., had presented to the Club large photographs of Ralph Tate, F.G.S., F.L.S., the Founder of the Club, and of George Crawford Hyndman, to be hung up in the Club-room.

"PERFORATIONS IN PRIMARY LIMESTONE."

The first paper was on "Perforations in Primary Limestone from North Donegal," by Mr. Joseph Wright, F.G.S., who said:—While spending a few weeks last September near the village of Dunfanaghy, North Donegal, his attention was drawn by one of his party to a great number of peculiar circular perforations in the primary limestone on the shore of Lough Sessiagh. The limestone in which these occurred was *in situ*, and sloped down at a very slight angle to the margin of the lake. The perforations, which were hemispherical in shape, varied somewhat in size, the largest and best-preserved being one inch in width and half an inch in depth. As he had never seen perforations like these before, his curiosity was aroused as to the manner of their formation. The only signs of life on the rock were a few small rounded clumps of moss, in size and shape the almost exact counterpart of the surrounding holes. As the moss would naturally accumulate moisture on the spot in which it grew, this moisture would act on the underlying limestone and

gradually wear it away. Once a cavity was formed, even should the moss die, rain water would enlarge and deepen it considerably in the course of time. Since his return a member of the Club had drawn his attention to various references on this subject in the first volume of the *Irish Naturalist.* Three explanations were given there, viz.:—The action of water, boring by the *Pholas* shell when the land was submerged, and excavations by our common land shell, *Helix aspersa.* Whatever might have been the origin of the perforations mentioned in the *Irish Naturalist*, he thought those seen at Lough Sessiagh, in Donegal, were undoubtedly produced in the manner he had described. Mr. Wright handed round specimens of this limestone, showing the perforations, and a discussion ensued, in which Messrs. William Gray, M.R.I.A., and R. Welch, M.R.I.A., took part.

"FOLK-LORE."

Mr. E. J. M'Kean, B.A., B.L., then read a paper on "Folk-lore." He began by showing the meaning and interest of the study, concerning which little enough had been collected in Ireland, and very little had been done in Ulster. Thus one of the widest spread of Ulster customs was practically unknown. He referred to the peculiar custom of cutting the churn or last handful of corn at harvest. This custom prevailed extensively over the five North-Eastern counties, and perhaps in some other Ulster counties. He could get no information of it in the South. Another curious harvest custom was the practice of wearing the cornbow at harvest-time. This prevailed widely through Antrim, and he had heard of it in Derry. He showed specimens both of a "churn" and of two "cornbows." Mr. M'Kean then went on to speak of Cranfield Well, near Randalstown. He showed a "Cranfield stone," given him as a charm, and mentioned the antiquity of the practice, referring to O'Laverty's "Diocese of Down and Connor." He then gave an account of a visit to the well last June, when he found some of the ancient practices still in use. He concluded by hoping that Ulster folk-

lore would soon attract more attention and be more fully collected.

The President, Messrs. William Gray, M.R.I.A., and A. Milligan took part in the discussion which followed.

ANNUAL MEETING.

The President then called on the Hon. Secretary (Mr. N. H. Foster, M.B.O.U.) to read the Annual Report, which again records increased membership, and shows the Club to be full of vigour.

The Statement of Accounts was read by the Treasurer (Mr. W. H. Phillips), and the Reports of the Botanical and Geological Sections by Messrs. A. Milligan and G. C. Gough. Mr. George Donaldson read the Librarian's Report; and Mr. R. Welch the Report of Sub-Committee who adjudicated on collections submitted in competition for prizes offered by the Club.

The President formally moved the adoption of the Report and Statement of Accounts.

Professor Gregg Wilson, D.Sc., M.R.I.A., in seconding, said the reports showed that the Club was very much alive, and they were very much indebted to the President for keeping it alive.

The President said the last few moments of the official year of the Club were now drawing to a close, and with them ceased his duties as President; but before the final moment of his office arrived he would like to say that the term of office had been to him—and of course he included his wife—one of great enjoyment in attempting to work for the Club, and the memory of it would be an ever-recurring delight. No official position, however, could in any degree be regarded as successful unless he had had the earnest, heartfelt support of the members of the Club, and especially that of the Vice-President, the Secretaries, and the Committee. That support had been most willingly given, and his wife and himself thanked them most heartily for it. He could bear testimony to the enthusiasm of the Committee in the interests of the Club, and

while such lasted the future success of the Club was well ensured.

Mr. William Gray, M.R.I.A., moved that the best thanks of the members of the Club be given to Mr. and Mrs. Fennell for their services to the Club during the past year.

Mr. R. Welch, M.R.I.A., in seconding, said both Mr. and Mrs. Fennell had taken a thorough interest in every department of the work during the President's years of office.

The motion was passed by acclamation.

Mrs. Fennell proposed that Mr. W. H. Phillips be elected President of the Club for the coming year. She was glad that he had at last consented to take office, and it gave her great pleasure to move that resolution.

Mr. J. M. Dickson seconded the motion, which was passed.

On the motion of the President, seconded by Mr. Thomas Anderson, Mr. Robert Patterson, F.Z.S., M.R.I.A., M.B.O.U., was re-elected Vice-President.

Mr. W. H. Phillips was re-elected Treasurer, on the motion of Mrs. Courvoisier, seconded by Mr. H. C. Marshall.

Mr. N. Carrothers proposed, and Mr. W. R. Pim seconded, the election of Mr. J. L. S. Jackson as Librarian, and the motion was passed.

Mr. G. C. Gough, A.R.C.S., F.G.S., and Mr. George Donaldson were elected Hon. Secretaries, on the motion of Mr. B. Hobson, seconded by Mr. W. F. M'Kinney.

A hearty vote of thanks was accorded to the outgoing Secretaries, Mr. N. H. Foster and Mr. James Orr, on the motion of the President.

The following were elected Members of the Committee:—Messrs. Robert Bell, W. J. Fennell, M.R.I.A., N. H. Foster, M.B.O.U., W. H. Gallway, W. A Green, Alex. Milligan, H. L. Orr, James Orr, Robert Welch, M.R.I.A., and Professor Gregg Wilson, M.A., D.Sc., M.R.I.A.

Suggestions having been put forward as to the places to be visited by the members of the Club during the summer excursions, and Miss Jean Agnew and Mr. R. A. Dawson, A.R.C.A., having been elected to membership, the proceedings terminated.

RULES

OF THE

Belfast Naturalists' Field Club.

(1904-05).

I.

That the Society be called "The Belfast Naturalists' Field Club."

II.

That the object of this Society be the practical study of Natural Science and Archæology in Ireland.

III.

That the Club shall consist of Ordinary, Corresponding, and Honorary Members. The Ordinary Members to pay annually a subscription of Five Shillings, and that candidates for such Membership shall first pay an entrance fee of 5/-, and be proposed and seconded at any meeting of the Club, by Members present, and elected by a majority of votes of the Members present.

IV.

That the Honorary and Corresponding Members shall consist of persons of eminence in Natural Science, or who shall have done some special service to the Club; and whose usual residence is not less than twenty miles from Belfast. That such Members may be nominated by any Member of the Club, and on being approved by the Committee, may be elected at any subsequent Meeting of the Club by a majority of the votes of the Members present. That Corresponding Members be expected to communicate a Paper once within every two years.

V.

That the Officers of the Club be annually elected and consist of a President, Vice-President, Treasurer, Librarian, and two Secretaries, and ten Members who form a Committee, and shall hold not less than eight Meetings in the year. Five Members to form a quorum. No Member of Committee to be eligible for re-election who has not attended at least one-fourth of the Committee Meetings during his year of office. That the office of President, or that of Vice-President, shall not be held by the same person for more than two years in succession.

VI.

The Committee may from year to year appoint a Sectional Committee as may be considered desirable to further original investigations in any one or more departments of the Club's work. Each Sectional Committee to be composed of six Members of the Club, not less than two being Members of the Club's Committee. No financial responsibility to be incurred by the Sub-Committee or any Officer of the Club without the previous approval of the Club's Committee. Any Sectional Committee may elect its own Chairman and Secretary from its Members.

VII.

That the Members of the Club shall hold at least Six Field Meetings during the year, in the most interesting localities, for investigating the Natural History and Archæology of Ireland. That the place of meeting be fixed by the Committee, and that five days' notice of each Excursion be communicated to Members by the Secretaries.

VIII.

That Meetings be held Fortnightly or Monthly, at the discretion of the Committee, for the purpose of reading papers; such papers, as far as possible, to be original and to treat of the Natural History and Archæology of the district. These Meetings to be held during the months from November to April inclusive.

IX.

That the Committee shall, if they find it advisable, offer for competition Prizes for the best collections of scientific objects of the district; and the Committee may order the purchase of maps, or other scientific apparatus, and may carry on geological and

archæological searches or excavations, if deemed advisable, provided that the entire amount expended under this rule does not exceed the sum of £10 in any one year.

X.

That the Annual Meeting be held during the month of April, when the Report of the Committee for the past year, and the Treasurer's Financial Statement shall be presented, the Committee and Officers elected, Bye-laws made and altered, and any proposed alteration in the general laws, of which a fortnight's notice shall have been given, in writing to the Secretary or Secretaries considered and decided upon. The Secretaries to give the Members due notice of each intended alteration.

XI.

Members of other Irish Field Clubs, residing temporarily or permanently in or near Belfast, may be enrolled Members of the Club without election or entrance fee on production of a voucher of membership of another Club, and without subscription for the current year on production of a receipt showing that such subscription has been paid to another Club. Failing the production of such receipt, the usual subscription for the current year to be paid to the Treasurer on enrolment. The names of Members so admitted to the Club to be published with the notice of meeting following the date of their enrolment.

XII.

That, on the written requisition of twenty-five Members, delivered to the Secretaries, an Extraordinary General Meeting may be called, to consider and decide upon the subject mentioned in such written requisition.

XIII.

That the Committee may be empowered to exchange publications and reports, and to extend the privilege of attending the Meetings and Excursions of the Belfast Naturalists' Field Club to Members of kindred societies, on similar privileges being accorded to its Members by such other societies.

RULES FOR THE CONDUCTING OF EXCURSIONS.

I. The excursion to be open to all Members, each one to have the privilege of introducing two friends.

II. A Chairman to be elected as at ordinary meetings.

III. One of the Secretaries to act as Conductor, or, in the absence of both, a member to be elected for that purpose.

IV. No change to be made in the programme, or extra expense incurred, except by the consent of the majority of the Members present.

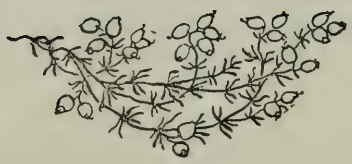
V. No fees, gratuities, or other expenses to be paid except through the Conductor.

VI. Every Member or Visitor to have the accommodation assigned by the Conductor. Where accommodation is limited, consideration will be given to priority of application.

VII. Accommodation cannot be promised unless tickets are obtained before the time mentioned in the special circular.

VIII. Those who attend an excursion without previous notice will be liable to extra charge, if extra cost be incurred thereby.

IX. No intoxicating liquors to be provided at the expense of the Club.



Exchanges of Proceedings.

Aberdeen Working-men's Natural History and Scientific Society.
Transactions, No. 1.

Barrow Naturalists' Field Club.
Annual Report and Proceedings, Vol. XVI.

Bath Natural History and Antiquarian Field Club.
Proceedings, Vol. X., Part 3.

Belfast—Natural History and Philosophical Society.
Report of Proceedings, 1903 and 1904.

„ Ulster Journal of Archæology.
Vol. XI., Part 1.

Berlin—Helio Abhandlungen und Mitteilungen, 1904.

Berwickshire Naturalists' Club.
Proceedings, Vol. XVIII., Part 1.

Brighton Natural History and Philosophical Society.
Annual Report and Abstracts of Papers, 1904.

Bristol Naturalists' Society.
Proceedings, Vol. IX., Part 2, 1899.

Bulletin, Society Linneinne, Nos. 323 to 342.

Cardiff Naturalists' Society.
Report of Transactions, Vols. XXXIV. and XXXV.

Dublin—Royal Irish Academy.
Transactions, Vol. XXIV., Section B., Part 5; Section C., Part 5.
Proceedings, Vol. XXV., Section C., Parts 1 to 5.

„ Royal Society of Antiquaries of Ireland.
Journal, Vol. XXXIV., Parts 1, 2, 3, and 4.

Edinburgh—Botanical Society.
Transactions and Proceedings, Vol. XXII., Parts 1 and 2.

„ Geological Society.
Transactions, Vol. VIII., Part 2 and special part.

Frankfort—Bericht der Senckinbergischen Naturforschenden. Gesellschaft, 1904.

Glasgow Natural History Society.
Report and Proceedings, 1901 and 1902.

„ Philosophical Society.
Proceedings, Vol. XXXII.

Hamilton Association.
Journal and Proceedings, 1903 and 1904.

Hertfordshire Natural History and Field Club.
Transactions, Vol. XII., Parts 1, 2.

Hull Scientific and Field Naturalists' Club.
Transactions, 1902 and 1903.

„ Public Library.
Report.

Leeds Philosophical and Literary Society.
83rd Annual Report, 1902 and 1903.

Leiden—Sgravenhage Rijks Enthograpich Museum.
Report, 1903.

Liverpool Geological Society.
Proceedings, Vol. IX., Part 4.

London—British Association for the Advancement of Science.
Report of the Southport Meeting, 1903.

„ British Museum Publications.
Handbook of Instructions for Collectors, Coral Guide.
"Southern Cross" Report.

„ Geologists' Association.
Proceedings, Vol. IX., Part 3.

Manchester Field Naturalists' and Archæologists' Society.
Report and Proceedings, 1903.

„ Microscopical Society.
Transactions and Annual Report, 1903.

Marlborough College Natural History Society.
Report No. 50.

Mexico—Bulletin of Institute of Geology, No. 16.

Montevideo—Museo Nacional.
Annals, Series 2, Part 1.

„ Geograpfia Fisica y Esferica Del Paraguay.

Norfolk and Norwich Naturalists' Society.
Transactions, Vol. VII., Part 5.

Nottingham Naturalists' Society.
Report, 1902 and 1903.

Nova Scotian Institute of Science, St. John's, Nova Scotia.
Proceedings and Transactions, 1900 and 1901.

Ottawa Literary and Scientific Society.
Transactions No. 1, 1899 and 1900.

Penzance Natural History and Antiquarian Society.
Report, 1897-98.

Peru—Boletin del Cuerpo de Ingenieros de Minas, Nos. 4 to 17.

Saint John's—New Brunswick Natural History Society.
Transactions, Vol. V., Part 1.

San Jose—Museo Nacional de Costa Rica.
Informe, 1897-98 and 1898-99.

Stavanger Museum.
Aarstberetning fur 1903.

Stone, Staffs.—North Staffordshire Naturalists' Field Club.
Annual Reports, 17 Volumes.

Toronto—Canadian Institute.
Transactions, Vol. VII., Part 3.
Proceedings, Vol. II., Part 3.

U.S.A.—Boston Society of Natural History.
Vol. XXX., Parts 3, 4, 5, 6, and 7. Vol. XXXI., Part 1.

„ Brooklyn—Institute of Arts and Science.
Cold Spring Harbour, Monographs Nos. 1 and 2.

„ Chapel Hill N.C.—Elisha Mitchell Scientific Society.
Journal, Vo. XX., Parts 1, 2, 3.

„ Chicago—Academy of Sciences.
Bulletin, IV.

„ „ —Field Columbian Museum.
Report.

U.S.A.—Madison Academy of Science, Art, and Letters.
Transactions, Vol. XI., 1896-97.

„ Milwaukie—Public Museum.
Annual Report, 1897-98.

, Missouri Botanical Gardens, St. Louis, Mo.
11th Annual Report.

„ New York—Academy of Sciences.
Annals of, Vol. XIV., Part 4. Vol. XV., Parts 1, 2, 3.

„ „ American Museum of Natural History.
Annual Report, 1902.
Bulletin, Vol. XVI.

„ Philadelphia—Academy of Natural Sciences.
Proceedings, Vol. LV., Part 3. Vol. LVI., Part 1.

„ Rochester Academy of Science.
Proceedings, 1901-02, 1903.

„ Salem—American Association for the Advancement of Science.
Proceedings of 49th Meeting, New York, 1900.

„ „ Essex Institute.
Bulletin, Vol. XXVIII., Nos. 7-12. Vol. XXIX., Nos. 7-12. Vol. XXX., Nos. 1-12.

„ Staten Island Natural Science Association.
Proceedings, Vol. IX., Parts 2 to 10.

„ St. Louis—Academy of Sciences.
Transactions, Vol. XII., Parts 9 and 10. Vol. XIII., Parts 1 to 9. Vol. XIV., Parts 1 to 6.

„ Tufts College, Mass.
Studies, No. 8.

„ Washington—Government Printing Offices.
Detached Papers by various Authors (4).

„ „ Smithsonian Institute.
Annual Report, 1902.

„ „ United States Geological Survey.
22nd Annual Report, Parts 1, 2, and 4.
23rd Annual Report, Part 1. (16 Papers, various.)

„ Wisconsin Geological and Natural History Survey.
Bulletins, Nos. 11 and 12.



List of Members.

Any Change in the Address of Members should be at once notified to the Secretaries by Post Card.

Hon. Members.

Jones, Prof. T. R., F.R.S., 10 Ulverdale Road, King's Road, Chelsea, London, N.W.
Lapworth, Professor Charles, LL.D., F.R.S., Mason College, Birmingham.
Plunkett, Thomas, M.R.I.A., Enniskillen.

Corresponding Member.

Holden, J. S., M.D., Sudbury, Suffolk.

Life Member.

Ewart, Sir W. Q., Bart., Glenmachan, Strandtown.

Ordinary Members.

Abraham, J. T., Croydon, Rosetta Avenue.
Abraham, Mrs. J. T., Croydon, Rosetta Avenue.
Adams, John J., M.D., Ashville, Antrim.
Allibon, George, 19 Short Strand.
Allingham, R., 30 North St.
Anderson, John, J.P., East Hillbrook, Holywood.
Anderson, Sir Robert, J.P., Donegall Place.
Anderson, Thomas, Embleton, Osborne Park.
Andrew, J. J., L.D.S., University Square.
Andrews, Miss M. K., 12 College Gardens.
Andrews, Miss, 12 College Gardens.
Barkley, James M., Queen's Square.
Barrett, J. H., Holywood.
Beattie, Rev. A. H., Portglenone.
Beck, Miss Emma, Hampton Terrace, Rugby Road.
Beggs, D. C., Ballyclare.
Bell, Robert, 64 Newington Avenue.
Bell, E. George, Bellevue, Lurgan.
Berry, Major R. G., M.R.I.A., Army Service Corps, Chatsworth, Chichester Park.
Best, James, Clarence Place.
Bigger, Francis Joseph, M.R.I.A., Ardrie.

Blackwood, Miss S., 69 Malone Avenue.
Blackwood, W. B., University Square.
Blair, E., Fernlea, Glenburn Park.
Blair, Mrs., Fernlea, Glenburn Park.
Blair, Mrs. E. S., Rusheen, Glenburn Park.
Bland, Major-General, Woodbank, Whiteabbey.
Boyce, Joseph, 29 India St.
Boyd, J. St. Clair, M.D., Chatsworth, Malone Rd.
Boyd, J. St. Clair, Jun., Chatsworth, Malone Rd.
Boyd, Miss, The Laurels, Cultra, Holywood.
Boyd, W. C., Hazelbank Villa, Ravenscroft Avenue.
Boyd, George A., 30 Willowbank Gardens, Antrim Road.
Bradford, Samuel, Cherryvalley, Knock.
Braithwaite, W. T., Dublin Road.
Brandon, Hugh B., 2 Wellington Place.
Brenan, Rev. S. A., M.A., Shand House, Cushendun.
Brett, Chas. H., Gretton Villa South.
Bristow, Ven. Archdeacon, St. James' Rectory.
Brown, John, F.R.S., Longhurst, Dunmurry.
Brown, Thomas, 102 Donegall Street.
Browne, W. J., M.A., Templemore Park, Londonderry.
Bruce, Mrs., Thornly, Holywood.
Bulla, Charles, 65 Malone Avenue.
Burgess, Mrs., 112 Eglantine Avenue.
Burrows, W. B., Ballynafeigh House.

Calwell, John Y., Woodlawn, Belmont.
Calwell, Mrs., Woodlawn.
Campbell, J. O., B.E., Carleton, Carolan Road, Annadale.
Campbell, D.C., Templemore Park, Londonderry.
Campbell, Wm. M., Eglantine Avenue.
Carmody, Rev. W. P., Carrowdore, Donaghadee.
Carrothers, Nathaniel, 4 Stranmillis Gardens.
Carruthers, Miss, 9 Claremont Street.
Carson, J. C., 8 Wellington Place.
Carson, John, Walmer Terrace, Holywood.
Cheyne, H. H., Roseneath, Bangor.
Christen, Madame, St. Imier, Brig o' Gairn, Ballater, N.B.
Christen, Mons. Rudolphe, Ballater, N.B.
Christy, William, 81 Enfield Street.
Clarke, Mrs. John, Lindisfarne, Annadale.
Cleland, James A., Bernagh West, Malone Park.
Cleland, W. W., 48 Wellington Park.
Cleland, Mrs. Annie, Macedon, Green Road, Knock.
Cleland, Alex. M'I., Macedon, Green Road, Knock.
Cochrane, Robert, M.R.I.A., 17 Highfield Road, Dublin.
Cochrane, Hugh, Rosemount, Adelaide Park.
Cocking, Miss C. E., Martinbank, Huddersfield.
Cocking, Miss M. A., Martinbank, Huddersfield.
Coleman, J., 2 Rosehill Terrace, Queenstown.
Corry, W. F. C. S., Glenbank, Bangor.
Costigan, Wm., 4 Great Victoria Street.
Cotter, J. S., B.A., 25 South Parade.
Cottney, John, Clogher, Hillsborough.
Coulson, Gerald, 2 College St. South.
Coulter, Mrs., Bangor.
Coulter, George B., Donegall Place.

Courvoisier, Mrs., 5 Windsor Gardens.
Courvoisier, Miss Y., 5 Windsor Gardens.
Craig, John C., 14 Atlantic Avenue.
Craig, Leslie, 14 Atlantic Avenue.
Crawford, F. H., 20 Mill Street.
Cromie, Robert, Park Road.
Cunningham, Charles M., L.D.S., D.D.S., Rostellan, Malone Rd.
Cunningham, Samuel, Glencairn.
Cunningham, E., Reform Club.
Curley, Francis, High Street.
Curley, Mrs., Dunedin Terrace.

Davies, John Henry, Lenaderg, Banbridge.
Day, Robert, M.R.I.A., J.P., Cork.
Deane, Arthur, Municipal Museum, Royal Avenue.
D'Evelyn, Alex. M., M.D., Ballymena.
Dickson, John M., 41 Prospect Terrace.
Dickson, Wm. W., 52 Pakenham Place.
Dobbin, Mrs. W. C., 12 Brookvale Avenue.
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Annual Report and Proceedings.



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BRITISH MUSEUM
NATURAL HISTORY





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KILNASAGGART.

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ANNUAL REPORT AND PROCEEDINGS

OF THE

BELFAST NATURALISTS FIELD CLUB.

FOR THE YEAR ENDING 31st MARCH, 1906.

(FORTY-THIRD YEAR.)

BRITISH MUSEUM
NATURAL HISTORY



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1906.

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Annual Report.

The Committee have pleasure in submitting the Report for the forty-third year of the Club's existence. The number of members was 395 at the 1st of April, being one less than at the corresponding period last year; 28 new members have been elected, but one has not yet been enrolled, as the entrance fee and first year's subscription are still unpaid. The Club has lost 28 members through death and resignation. During the year nine Committee meetings have been held, the average attendance being 9.7 out of a possible 15.

The Summer Programme, as usual, consisted of Excursions, eight being arranged for as follows:—

Dungannon	20th May.
The Gobbins (Half-day)	10th June.
Diamond Rocks (Mourne Mountains) ...	1st July.
Dundalk (Long Excursion with D.N.F.C.)	12th to 14th July.
Magheramorne (Half-day)	29th July.
Ballinderry	12th August.
Church Hill, County Armagh	26th August.
The Knockagh (Half-day)	9th September.

These were duly carried out, with the exception of the last, which was postponed owing to unfavourable weather, only one member meeting the secretaries at the station. The attendance at the excursions was scarcely as good as it has been in former years, the largest attendance being at the ever-popular Gobbins Excursion, when 126 were present. In connection with these excursions the Committee desire to record their indebtedness to the officers and members of the Tyrone Field Club, Lord Ranfurly, Lord Roden, Colonel M'Calmont, Mr. Verner (of Church Hill), and Mr. H. Garnett (of Maghery) for either help and guidance or for permission to visit grounds. Also to Mrs. Walkington (of Ballinderry) for her hospitality on August 12.

The Winter Session began in the usual way by a conversazione in the Exhibition Hall, over four hundred members and

friends attending. Thanks are due to Mr. M'Kimm for his help on this occasion. Besides the ordinary monthly meetings, the informal meetings commenced last session on Wednesday evenings, were continued, and were well attended. Two of the papers read this session were deemed by your Committee worthy of being printed *in extenso*, and are issued as appendices to the proceedings. They are by Madame Christen and Mr. Strachan respectively. The following is a complete list of the meetings held this Session:—

1905.

Tuesday, November 21st—Presidential Address, "Reproduction in Ferns," W. H. Phillips.

Wednesday, November 29th—"Bird Watching." N. H. Foster, M.B.O.U.

Wednesday, December 13th—"Birds' Nests." Professor Wilson, D.Sc.

Tuesday, December 19th—"A Week in Innismurray." F. J. Bigger, M.R.I.A.

1906.

Wednesday, January 3rd—"Prehistoric Man." Alex. Milligan.

Wednesday, January 10th—"Origin of Carnmoney Chalcedony." J. Strachan.

Tuesday, January 16th—"Summary of Club's Recent Glacial Work." Madame Christen, and "Stone Axe Factories near Cushendall." W. J. Knowles, M.R.I.A.

Wednesday, January 24th—"British Star Fishes." W. H. Gallway.

Wednesday, February 7th—"Dene Holes and Souterrains." Mrs. Hobson.

Wednesday, February 14th—"Age of the Earth." G. C. Gough, F.G.S.

Tuesday, February 20th—"Wood." A. Deane.

Wednesday, February 28th—"Simple Mounts for Common Objects." H. L. Orr.

Wednesday, March 7th—"Evolution of the Mourne Mountains." W. J. C. Tomlinson.

Wednesday, March 14th—"Coins." W. H. Robinson.

Tuesday, March 20th—"Spiders." G. C. Gough, A.R.C.Sc.

Wednesday, March 28th—"American Mound Builders." S. Knabenshue.

Tuesday, April 10th—"Report of the British Association Delegate." William Gray, M.R.I.A.

Wednesday, April 25th—Annual Meeting.

In November, 1905, Sir Donald Currie having offered £20,000 to Queen's College Equipment Fund on condition that a similar sum was raised locally, your Committee started a subscription list among members of the Club, with the result that £20 was raised and sent to the President from the Club.

Delegates from the Club attended the meeting of the Irish Field Club Union Committee in Dublin on November 1st.

Mr. Fennell, M.R.I.A., was re-elected a member of the Council of the Ulster Fisheries Association, and Mr. William Rankin was elected to take the place of Mr. W. A. Green, who resigned owing to pressure of business. Amongst the honours to members must be placed Professor Gregg Wilson's election as a Vice-President of the Royal Irish Academy. The Treasurer submits the statement of accounts, showing a deficit of £11 10s 5d, after all accounts have been paid. Reports from the Librarian and Geological and Botanical Sections are also presented. No collections were submitted this year in competition for the Club's prizes.

Finally, the Committee beg to tender their thanks to the superintendents of the railway companies for facilities afforded on the different excursions, to the Press for publishing reports of meetings, to the public bodies and kindred societies who have presented publications during the past year, and to Mr. Gray for his services as Delegate to the British Association Meeting.

(Signed) GEO. C. GOUGH, } *Hon.*
GEO. DONALDSON, } *Secs.*

Librarian's Report:—

During the year we have to report a continuance and enlargement of our exchange with the various Societies of Great Britain, America, the Continent, &c. There have been several applications from Societies which have not already exchanged with us, and as far as possible we have complied with their requests for our proceedings, viz., The Perthshire Natural History Society and the Lloyd's Library, Cincinnati, both of which tender their thanks to the Committee for their kindness.

The following Societies, not already on our list of exchange, have sent us their publications:—Limerick Field Club, Liverpool Naturalists' Field Club, California Academy of Sciences, and the Queensland Museum. These Societies are now entered on our list, and will receive our publications regularly.

The Library is having additional volumes added to its cases, and it is pleasant to note there is a good demand for the various books by the members of the Club.

It must again be urged upon members taking out books the necessity of entering their name, together with the name or number of the book taken out, in a book which is provided for the purpose, and which is always convenient. There are several books out with members which cannot be traced, and if they were entered as early as possible, or returned, it would be more satisfactory.

(Signed)

J. L. S. Jackson, *Hon. Librarian.*

Report of Botanical Section:—

The Committee of the Botanical Section beg to report that since the last annual meeting the work of this department of the Club has been maintained, with results which we regard as very satisfactory.

The outdoor work was carried on to some extent in conjunction with the Geological Section, also by mutually-arranged small parties, and by individual members.

From the items reported as worth recording we submit the following:—Mr. N. Carrothers collected *Habenaria albida* at Fair Head, and he also found the royal fern, *Osmunda regalis*, on the same excursion. He found the rare plant, *Mercurialis perennis*, at Church Hill, Co. Armagh, this being a new locality for it, and the second record of it from that county. He observed the Scottish lovage, *Ligusticum Scoticum*, south of Donaghadee, near Millisle, and he also found *Pyrola minor* on the Cavehill, where it has been sought for in vain for many years.

Mr. H. C. Marshall reports having found a rare variety of *Athyrium*, and Mr. W. Porter similarly reports a new variety of *Blechnum spicant.*

In addition to the above, Mr. W. J. C. Tomlinson reports a long list of interesting records in a short paper, which he read

recently at a meeting of the Botanical Section, and which will be found in another part of these proceedings.

(Signed)

ALEX. MILLIGAN, *Hon. Sec. of Section.*

Report of Geological Section:—

The Geological Section wish to report another year of steady work; the interest of the members previously recorded in past years being well maintained, and we are pleased to note our membership is increasing.

During the year several excursions were held, and although the attendance might have been larger, the enthusiasm of those present made the meetings instructive and successful in their object. The localities visited were:—Cavehill and Carr's Glen, Dundonald, Tardree, Colin Glen, Kilcorrig, and Cultra.

Several very instructive lectures were given during the winter at the Wednesday evening meetings. Mr. J. Strachan contributed a paper on "Origin of Carnmoney Chalcedony," which was well illustrated by specimens and diagrams. Mr. G. C. Gough, F.G.S., gave a very able paper on "The Age of the Earth," and Mr. J. C. Tomlinson discussed a very interesting subject in "The Evolution of the Mourne Mountains," the attendance at these meetings being large, and including many of the Club's members, in addition to those belonging to the Section.

We have great pleasure in announcing that the paper read by Madame Christen, "A Resumé of the Club's work on Glacial Geology," and Mr. J. Strachan's paper, "Origin of Carnmoney Chalcedony," are to be published as appendices to this year's Club's report.

Following on Madame Christen's previous work on Glacial Geology, which is so valuable, it has been decided to revive this interesting subject, and, if possible, make further additions to it.

On 9th June the Geological Section of the Leicester Literary and Philosophical Society arrived in Larne to make a

tour of the Antrim Coast, under the able conductorship of Mr. R. Welch and Mr. G. C. Gough. Being favoured with fine weather, they greatly enjoyed their stay, and the majority extended their visit by a number of days.

During the year Mr. R. Welch examined a section of raised beach at Mount Vernon, Shore Road, in which he found worked flints, charred remains, and fragments of Patella and Ostrea. This section was exposed during the tramways reconstruction, and is now covered up by the new retaining wall.

The Committee heartily wish all members of the Club interested in Geology to join the Section, and by their co-operation help to make the meetings both instructive and successful.

(Signed)

J. L. S. Jackson, *Secretary.*

Dr. Treasurer's Account for Year ending March 31, 1906. Cr.

To Balance from last Account...				£15	4	9	
,, Subscriptions ...				94	15	0	
,, Entrance Fees ...				6	0	0	
,, Receipts of Conversazione				19	16	0	
,, Publications sold ...				1	3	0	
,, Balance due Treasurer ...				11	10	5	
							£148 13 7

By Printing, Advertising, and Stationery—					
Half-tone Blocks ...	...	£2	0	0	
Address ...	...	0	18	6	
Advertising ...	...	3	4	7	
Type Writing ...	...	3	19	8	
Printing and Stationery ...		22	17	8	
Printing Report, 1904-5 ...		27	0	0	
					£60 0 5
,, Expenses—Conversazione ...					21 0 5
,, Rent of Museum ...	...				18 0 0
,, Commission to Collector ...					4 8 3
,, Donation—Irish Naturalist ...					2 0 0
,, ,, Irish Field Club Union ...					2 2 0
,, Expenses of Lectures					4 11 0
,, Postages					29 12 0
,, Gas, 17/6. Insurance, 10/– ..					1 7 6
,, Prizes, £4 7s 0d. Ulster Journal, 5/– ...					4 12 0
,, British Association Subscription ..					1 0 0
					£148 13 7

Proceedings.

SUMMER SESSION.

EXCURSION TO DUNGANNON AND DONAGHMORE.

The first excursion of the 43rd year of the Club was held on Saturday, May 20th, 1905, in perfect weather, when a party of over 70 members met at the Great Northern Railway Station and took the 11-15 train for Donaghmore. They were joined en route by other members, and at Dungannon by a party belonging to the newly-formed Tyrone Field Club. Arriving at Donaghmore at one o'clock, the party, now numbering nearly 100, and under the leadership of Mr. Bradley, of the Tyrone Field Club, walked to the old cross of this village. Donaghmore at one time possessed an extensive ecclesiastical settlement, dating from the early Christian Church founded by St. Patrick. Every trace of this establishment has long since vanished. In the taxation of Pope Nicholas in 1291 it is described as having many costly shrines. Petrie says, "No remains of the church are now to be seen," but it has been ascertained that it stood a little to the north-east of the present village. The ancient cross is still standing, although not in its original position, it having been overthrown in the war of 1641. In this condition it remained till 1776, when it was removed and placed where it now stands at the head of the village. It consists of plinth, shaft and cross measuring sixteen feet in height, and sculptured with scenes from Scripture history. The ancient bell of Donaghmore, inscribed "Patrici," and dated 1272, is in the museum of the Royal Irish Academy. The Rev. Mr. Latimer having briefly described the cross, a move was

made to the graveyard, in front of which the cross stands. This contains the remains of an ancient font and a rather curious modern monument erected "To the memory of Hugh O'Neill, of the Red Hand of Ulster, created Earl of Tyrone by her Majesty Queen Elizabeth, and afterwards elected King of all Ireland by the kings, chiefs, and earls and with the unanimous goodwill of the common people of the country." Hugh O'Neill died at Rome on July 20th, 1616. After leaving the graveyard, Mr. Brown very kindly offered to conduct the party over his soap works, and the members were much interested in the various processes of soap, glycerine, and candle making.

A start was now made for Dungannon, and, while some of the party took the train, the majority walked along the old road, a distance of about two and a half miles, which yielded a large number of wild flowers to the botanists. On arriving at Dungannon the party proceeded up the hill to the site of O'Neill's Castle, of which Mr. James M. Hamilton, town clerk, gave a brief account. He, in a few words, welcomed the members of the Belfast Naturalists' Field Club to the town of the Volunteers and to the historic site of the famous castle of the O'Neills. The ruins they now saw were not those of O'Neill's Castle, but of a much more modern building, erected towards the end of the 18th century by a Mr. Hannyngton, whose family resided in Dungannon for several generations. The only ruins connected with the ancient castle now visible were those of the chapel which was attached to same, and the underground passages which ran underneath the castle in the direction of the chapel. It was said that these passages ran considerable distances underneath what is now the town of Dungannon, but, if so, traces of them in that direction are now lost.

The speaker briefly referred to the rebellions of the O'Neills during the reign of Elizabeth, to the battle of Benburb, in which the English were defeated; and to the final overthrow of O'Neill by Lord Mountjoy, which caused the Irish chieftain to set fire to the castle at Dungannon and flee to France.

After a short stay on the hill, which is approximately the centre of Ulster, and from which many of the surrounding counties can be seen, the party proceeded to Northland House, the seat of the Earl of Ranfurly, who had kindly granted permission to the Club to visit the park, and also to inspect some of the curios which he had brought with him from New Zealand and adjacent islands. The curios, which were shown and explained by Mr. C. B. Chambré, were mostly the work of Maoris, and consisted of various woven articles—the feather rugs, &c., especially being greatly admired; idols carved in wood, with stone implements; various native dresses, pictures, axes, and many other things, all of which were examined with interest by the members. The conservatory, with tree and other ferns, and plants also from New Zealand, was also visited, and then the party scattered through the park, each to follow his or her favourite branch of natural history. At 5-30 the members assembled at the Northland Arms Hotel, where tea was served. After tea a business meeting was held, the President (Mr. W. H. Phillips) in the chair. After making a few remarks he called on Mr. W. J. Fennell, M.R.I.A., who proposed that the best thanks should be given to the Earl of Ranfurly for his kindness in throwing open his house and park to the Club. This was seconded by Mr. William Gray, M.R.I.A., and carried unanimously. Mr. Chambré, who had acted as guide to the curios and to the park, was included in this vote, and suitably responded. The President then proposed a vote of thanks to Mr. Bradley, Mr. Brown, Mr. Hamilton, and other members of the Tyrone Field Club who had done so much to make the excursion a success. This was carried, Mr. Bradley and Mr. Hamilton replying for themselves and for the local Club. Mr. Gray was then elected as delegate for the Club to the British Association, being proposed by Mr. Donaldson and seconded by Mr. Welch, M.R.I.A. The election of five new members brought the meeting to a close, after which the 6-45 train was caught, and the party arrived in Belfast soon after eight o'clock, all agreeing that the first excursion had been a success, looked at from every standpoint.

Various accounts were handed in by the authorities on the different branches of natural history. Although the district is interesting geologically, time did not permit much of an examination. Interesting finds have been made by Mr. Chambré in the gravel in front of Northland House in the shape of quartz pebbles with very thin veins of gold. Unfortunately the original matrix of these pebbles is not known. The ornithologists report that thirty-eight species of birds were observed during the day. The most interesting observation made by them was that of the male widgeon (Mareca penelope) on the lake in Dungannon Park. It would be interesting to discover if this bird were breeding here, as the species usually migrates northwards at a much earlier date, and so far no authenticated instance of its breeding in Ireland has been recorded.

Owing to the excessively dry, hot weather even the commonest species of land and fresh-water mollusca were absent in many typical habitats. Such ubiquitous species as Helix rotundata and Arion hortensis were not noticed at all, and the day's collecting on what would have been considered good ground, under the conditions resulted in only sixteen species being collected, where over thirty might be expected. Very large specimens of the bubble shell were found in one marsh with some of the coil shells (Planorbis albus and P. contortus). and in the Ranfurly Park lake some nice specimens of the little bivalve (Sphærium corneum) were found along the margin, as well as some pisidia too young to identify with certainty.

The entymologists reported the red admiral and orange-tip butterflies, while one member obtained a small but perfect wasp's nest.

The botanists were also very busy, being stimulated by the offer of a book prize by the President for the best collection of wildflowers. This was won by Miss Ella Boyd, of the Dungannon Club, whose vasculum contained eighty species of plants. The best find of the day was Ranunculus trichophyllus, which has only been recorded from County Tyrone on one previous occasion.

EXCURSION TO THE GOBBINS' CLIFF PATH.

The second excursion of the season, under the guidance of the President (Mr. W. H. Phillips) and the Secretary (Mr. George Donaldson), took place on Saturday, June 10th, when one hundred and twenty members and friends left by the quarter-past two train to Ballycarry en route for the Gobbins. The programme issued to the members of the Club was accompanied by a copy of the pamphlet on "The Gobbins Cliff Path," written by Mr. W. J. Fennell, M.R.I.A., for the visit of the British Association to Belfast in 1902, and which has since been re-issued by the Directors of the Midland Railway Company, who courteously supplied four hundred copies for distribution amongst the members, thus affording a very complete programme of the scenery, geology, botany, and ethnography of the district, as well as a full description of the almost enchanted walk constructed round the cliffs and through the caves of the great headlands of the Gobbins.

Arriving at Ballycarry, the party divided—half driving to the "path," and the rest walking the whole distance along the undercliffs to the basaltic bastions of the coast. The walk afforded many opportunities of investigation for the botanists and the geologists. The former reported that the wood vetch (Vicia sylvatica) and the adder's tongue fern were found in great abundance; but much indignation was felt by them when it was discovered that the sea spleenwort (Asplenium marinum), which Mr. Berkeley Wise had taken so much pains to protect, had almost entirely disappeared. The cretaceous beds are referred to by Dr. Hume as being well exposed on the shore, and that every member of the series is visible. "The order of succession is as follows, commencing from the top:—1. Compact limestone containing green sponge nodules. 2. Limestone characterised by great abundance of sponge remains: Ventriculites cribrosus and Etheridgia mirabilis. 3. Chloritic chalk and sands; with Echinocorys gibbus, Parasmilia centralis, Bourgueticrinus (portions of stem), Cidaris spines, probably C. sceptrifera, Terebratula carnea, Spondylus spinosus, Exogyra, Inoceramus fragments and numerous sponges. 4. Band of

Serpula filiformis. 5. Soft glauconitic sands. 6. The yellow sandstones and marls, in which may be found Pecten quadricostatus, Vermicularia concava and V. quinque-carinata. 7. The glauconitic sands, well exposed at low tide, of the usual blue-green colour; fossils abundant; Exogyra conica, var. lævigata, Pecten orbicularis, P. (Janira) quinquecostatus, P. (Chlamys) asper, P. galliennii, and a special feature is the abundance of small brachiopoda, especially Rhynchonella, Terebratula, Kingena lima, turbinate gasteropoda, aviculæ of different species, teeth of fishes, and a belemnite which foreshadows the characters of Belemnitella (Actinocamax) vera, but is much longer and thinner." The same authority also mentions that "The spongarian layer is particularly prominent, as weathering causes the sponge fragments to stand out in branching masses on the surface of the rock. Echinocorys scutatus is also abundant, so, too, is Camerospongia fungiformis, and casts of lamellibranchiata. The character of the chloritic sands is well illustrated near Hillsport by a large mass which has slipped down from the hillside. Instead of the fossils being irregularly scattered through the rock, clearly marked bands are noticeable." Before leaving the chalk attention was directed to an interesting study in some of the great blocks that lie inward on the long green braes of the undercliff. In these will be found a number of spherical chambers slightly over an inch in diameter, some solitary and some so clustered together that they have cut one into another. These are the winter homes of the common garden snail (Helix Aspersa), which wanders into a crevice to hibernate, and when well under cover gradually begins to excavate his cave-dwelling—no one knows how, or at least no one has as yet satisfactorily settled that important architectural theory. At times the motion of the snail in his narrow home and the consequent expansion of his quarters leads to a jamb, the lowly creature becomes a prisoner, and, awakening in spring, dies of starvation. Many of the shells remain like bones in a broken tomb, and can be both seen and felt. This interesting phenomenon in rocks is close behind "Hill's cottage," a whitewashed habitation close by the shore.

At six o'clock tea was provided at Hill's cottage; and, although not served with the promptness, nor surrounded with all the desirable accessories of a high-class restaurant, was nevertheless much appreciated, after which a short business meeting was held, and some new members elected; then the return journey commenced, and the party entrained again, arriving in Belfast at a quarter-past nine.

EXCURSION TO MOURNE MOUNTAINS.

The third excursion of the summer season took place on Saturday, July 1st, to the Diamond Rocks and Tollymore Park. Many of the members left for their holidays on this day, and only forty-four met the conductors at the County Down Railway Station, where the 9-35 train was taken for Newcastle. On arrival here the party, augmented by two members who joined en route, took brakes and cars, and were driven to Trassey Bridge. Leaving the vehicles here the party divided, one half exploring Tollymore Park, and the other, including seven ladies, starting on the stiff climb to the Diamond rocks, led by Mr. Nevin H. Foster, and accompanied by two quarrymen with huge hammers, in order that the rocks might be more easily broken. After a long walk over very rough road the party breasted the Hare's Gap, and quickly reached their destination, where all were soon busy looking for "specimens."

The Mourne Mountains are of tertiary age, and have been intruded into the silurian beds, which to a large extent must have been carried up by the granite, as even after hundreds of years of denudation patches of these ancient sedimentary strata are still found at high altitudes. The mountains nearly all show the characteristic rounded top which a weathered granite mountain presents, while in places the smaller masses showed another characteristic of granite—namely, the smooth weathered rounded surfaces of the jointed mass, looking as if it had been rounded by water action. The granite varies in coarseness from place to place. That of the Diamond Rocks shows well

the "drusy" cavities associated with the Mourne Mountain granite. These are cavities in the rock, perhaps contraction rifts, where the essential minerals of the rocks have been able to crystallise without mutual interference, and, as a result, fine crystals of felspar, smoky quartz, and mica were obtained. Not uncommonly crystals of beryl and topaz are also to be obtained, and the efforts of the party were largely directed to this end, but, with two exceptions, only small specimens of these were found. The exceptions were two very nice crystals of topaz found, one by a lady and the other by the Secretary of the geological section. Microscopically this rock is a granophyre, showing well-marked granophyric structure where the felspar and quartz have crystallised out simultaneously and mutually interfere.

The start for Trassey Bridge was made about four o'clock, and the brakes met there at 5-30. Passing through Bryansford the members who had walked through the park were joined, and the whole party were driven back to Newcastle, where tea was provided at the Donard Hotel.

Afterwards a short business meeting was held, and the President (Mr. W. H. Phillips) called upon Mr. W. H. Patterson, M.R.I.A., to propose a vote of thanks to Lord Roden for so kindly granting the use of his grounds to the Club, which was seconded by Dr. Sheldon and carried unanimously. The senior Secretary, then, on behalf of the Club, said how pleased they were to see the Rev. J. F. Blake, one of the best known of the British geologists, with them that day, and one who had done so much in the cause of that science.

Reference has already been made to the finds of the geologists. Various beetles and spiders were taken home to be identified later; while very few birds were reported. The botanists, however, had a field day, and many fine specimens were found. The ferns were especially well represented. Blechnum spicant was everywhere; while Lastrea pseudo-mas (in various forms), Lastrea preopteris, Lastrea dilatata, and Athyris filis-femina were plentiful. A crested form of the

latter, a branched Blechnum spicant, and a variegated Pteris aquilina were the rarities among the cryptogams. Among the flowering plants the following are some of the less common ones recorded on the excursion:—The cow-wheat (Melampyrum), bog pimpernel (Anagallis tenella), golden rod (Solidago virgaurea), viper's bugloss (Echium vulgare), bladder campion (Silene cucubalus), sundew (Drosera rotundifolia), tutsan (Hypericum androsœmum), dwarf juniper (Juniperus nana), guelder rose (Viburnum opulus), and the danewort (Sambucus ebulus).

A prize offered by the Vice-President (Mr. Robert Patterson, M.R.I.A.) for the best collection of flowers only resulted in one collection being given in, and, as this was not up to the standard, the prize was not awarded.

"LONG EXCURSION" TO DUNDALK, &c.

The Annual "Long Excursion" of the Club took place on the 12th, 13th, and 14th July, in conjunction with the members of the Dublin Naturalists' Field Club, the place selected being Dundalk and district. Members and friends assembled at the terminus of the Great Northern Railway early on the morning of the 12th, and soon all were comfortably seated in a specially reserved carriage, and reached Dundalk at the appointed time. Here they were joined by the members of the Dublin Club, and the combined party were accommodated with excellent quarters in the Imperial Hotel. After a much-appreciated lunch brakes were entered, and the party drove to the first place to be visited, Louth Abbey. Before the advent of Christianity Louth was occupied by a Druids' grove. Here St. Mochta founded his first church and built a cell. Louth at that time must have been an ideal place for the purpose, being in the midst of a fertile plain and well wooded. The Abbey of Louth had a very long, useful, and checkered career, was many times sacked and burned by the Danes and other enemies, until


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PHOTO. G. DONALDSON.

ST. MOCHTA'S HOUSE.

finally closed at the dissolution of the monasteries by Henry VIII. Close by the now-ruined abbey stands one of the most interesting buildings in the county, St. Mochta's house. (See Plate XIII.) It is a two-storeyed building, standing behind the church, which was meant to serve the double purpose of oratory and sleeping apartment. The building is probably the earliest example still existing of the most perfect system of stone roofing employed by the Irish. We have the barrel-vault, springing from the walls at 6 feet 9 inches from the ground, and above it the pointed barrel vault, both built on the regular arch principle; the lower storey is 16 feet long and 10 feet broad and 10 feet high. The top storey is 9 feet broad and 8 feet high. A stone staircase, through a quadrangular opening about 20 inches wide, leads to the top storey. The only window at all perfect that is left is at the west end, 6 feet 8 inches high by 4 feet wide. The features of the doorway are nearly all destroyed, but we can still see that it was covered by a single stone lintel. Unfortunately the whole building is in a very bad state, and if not looked after will soon disappear. The Louth Archæological Society is taking steps to have the building enclosed, but it is a pity that an interesting ruin such as this could not be placed under the care of the Board of Works and saved from further destruction.

But time is passing, and the conductor's whistle lets us know we must get on, so brakes are again mounted and we are driven off to Dromiskin, passing on the way many places of interest, amongst the rest Killincoole Castle, one of the most perfect of the castles of the Pale. Arriving at Dromiskin the round tower, church, and graveyard were all examined, and again nothing but regret could be expressed at the way the hands of the careless and the vandal are destroying our ancient monuments. Here a fine Irish cross, which 170 years ago stood erect and perfect, is now broken into bits, and all that is left are the arms stuck in the ground to mark some obscure grave. Through the kindness of one of the members, afternoon tea was served in the graveyard, after which the brakes were again mounted, and the whole party drove off highly pleased and

delighted with their first day's work. During the day the botanists of the party were very busy, and many plants that are rare or absent in the North were recorded.

Thursday, the 13th, found the party up and eager for the day's work, and at 9 o'clock all were again seated in brakes, and were fortunate enough to be accompanied by a very large number of the members of the Louth Archæological Society (under whose guidance the clubs were for this day), and started for Castletown Castle and the great mound or fort called Dundalgan, which is said to have given the name Dundalk to the town. Arriving at Dundalgan, Mr. Wm. Tempest, J.P., acting as local guide, explained with great clearness the different features of the mound, and also the very interesting and almost perfect castle adjoining—permission for the visit having been kindly granted by Mr. E. Bigger, J.P. A little further along the road the very interesting Fort of Rosskeagh was examined, and again Mr. Tempest gave the party all the information available about this very curious structure. It appears to have been a compound fort, but from the way in which the hand of time, aided by that of the despoiler, has done its work, it is now very hard to say what the original structure was like. But time was passing, and we had to drive on to Faughart, where a most interesting group of remains was visited—fort, church, and graveyard. The Church of St. Brigid is the most interesting of the group, but all that now remains of the structure are a few broken walls crumbling to dust, and with only traces of windows left, but the romantic halo of the past invests these bits of stone and mortar with an undying interest. St. Brigid, who was born close at hand in 480, built this sacred edifice before she built the splendid nunnery still remaining in Kildare, and here on the 14th of October, 1318, was interred the headless body of Edward Bruce, the last King of Ireland, after the disastrous battle which crowned his misfortunes in the valley below, but the visitor searches in vain for any memorial of the illfated monarch, and has to take for granted that amongst the crowned and saintly dead with which the place is crowded Ireland's last monarch found a resting place. But again the

conductor's whistle was heard, so on we drove past Moira Castle, or what remains of it, a very strong and important structure, once guarding the celebrated Moyra Pass, to the remarkable stone of Kilnasaggart. (Plate XII.). This standing stone or cross stands over seven feet high, is about eighteen inches wide, and only six inches thick. It is ornamented on the one side with no less than ten crosses, within circles of various sizes, the other face having two crosses, one plain and the other enclosed in a circle, and with the following inscription:—"This place, Ternoc, son of Ciaran the Little, bequeathed it under the protection of the Apostle Peter."

But "move again," is the order of the conductor, and we are off to Ravensdale Park, the beautifully-situated demesne of the Right Hon. Sir Daniel Dixon, Bart., Lord Mayor of Belfast, kindly thrown open for the inspection of the members of the united clubs. Here the first thing done was to make afternoon tea, and with the kind assistance of the housekeeper, who had everything ready, the ladies of the party soon had all the members enjoying the cup which cheers, in the large dining-room. The party then broke up into various sections. Some visited the gardens, others went botanising through the park, and the remainder went to view and photograph the stone circle lately discovered here by the Rev. N. Lawless, P.P., of Faughart. They very soon found the circle; one of the pillars has fallen, but seven others remain as they were placed 3,000 years ago. At five o'clock all assembled in front of the residence, when the following resolution was passed with much cordiality:—"That the best thanks of this meeting of the united societies be conveyed to Sir Daniel Dixon, Bart., Lord Mayor of Belfast, for his kindness in throwing open his beautiful park and residence for the use of the members on this occasion." The next item on the programme was the visit to the great cromlech known as the Giant's Load. This imposing cromlech, one of the finest in Ireland, is not nearly so well known as it should be. It consists of four rough stones of immense size; three of them support the large flat stone forming the top of the cromlech on almost infinitesimal points; the front stone, which was cracked

and likely to give way under its heavy load, has been strengthened with a large bed of concrete, which, it is hoped, will preserve the cromlech from destruction. In the same field is one of those curious structures known as kistevaens, or giant's graves, composed of about thirty rough stones, enclosing an irregular space about 30 feet long by 5 feet broad, with what would appear to be at the head of the grave a stone far larger than the others, resting slantwise on five of the smaller stones. For what purpose this immense structure was raised history is silent, but legendary lore has caused it to be named "The Giant's Grave," and it was with deep regret that the party left this wonderful group of prehistoric monuments and drove back to Dundalk, where a good dinner was awaiting them at the Imperial Hotel.

After dinner a business meeting was held—Mr. W. F. De V. Kane, D.L., in the chair—when the following resolution was passed:—Proposed by J. De W. Hinch and seconded by J. N. Milne—"That the best thanks of the Belfast and Dublin Naturalists' Field Clubs are due to the Council and members of the Louth Archæological Society for their kind assistance and company during the day." The resolution was spoken to by Mr. H. Morris and Mr. H. G. Tempest on behalf of the local Society, after which, as it was now 11 p.m., the members dispersed, well pleased with their day's enjoyment.

7-30 a.m. on Friday, the 14th inst., found all assembled at breakfast, and the 8-48 a.m. train was taken to Ardee. Here the party was met on the platform by Joseph T. Nolan, M.A., President of the Louth Archæological Society, who kindly acted as local guide during the day. The first place visited was the church, a structure dating from 1207, which retains many features of the original building, all of which Mr. Nolan pointed out. Canon Ford afterwards joined the party, and assisted by pointing out some additional features, and also showed them a splendid hammered silver communion cup, dated 1694. They then visited the two ancient castles in the town, one of which has been converted into a very comfortable dwelling-house, and the other into a good courthouse, where


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PHOTO. G. DONALDSON.

ARDEE CASTLE.

the sessions of the district are held. (Plate XIV.). The party climbed up to the roof, from which a good view of the district was obtained, and the botanists were pleased to find the Wall-pellitory, Parietaria officinalis, with many other rare plants, growing in great abundance on the walls. Here the party broke up, one section going to Ardee Bog for botanical and conchological purposes, while the main party followed Mr. Nolan to a large fort, situated about a quarter of a mile from the town, called variously the Priests' Mount, Castle Guard, and in the ordnance survey maps Dawson's Court. Gigantic as its proportions appear in the present day, they compare unfavourably with its dimensions as given by Wright in his "Louthiana." He states that the perpendicular height of the mound as from foundation to top was nearly 90 feet, depth of the main trench 30 to 40 feet, circumference at top 140 feet, and round the foundations upwards of 600 feet. At present the height does not exceed 50, while the circumference of the top was nearer 200 than 140 feet, showing that a great deal of the top has been removed since Wright's time—that is, 1748.

The section that went to the bog had now returned, well pleased with their finds, and all adjourned to the Ruxton Arms, where a good tea was provided, after which the 3 o'clock train was taken back to Dundalk.

Now began the least enjoyable duty of the trip—namely, packing up to come away—as all had enjoyed themselves greatly during the past three days, and great regrets were expressed that the visit could not be prolonged. All hoped to visit Louth again at no very distant date, as many quite as interesting objects had to be left unvisited. Dinner was partaken of, and the 7-16 p.m. train brought the members back to Belfast, which was reached safely at 9 p.m., when the members separated.

The following plants were found, more or less plentiful, during the excursion:—Bloody cranesbill (Geranium sanguineum), the Field Poppy, (Papaver rhæas), English catchfly (Silene anglica), White Campion (Lychnis vespertina), Goat's Beard (Tragopogon pratensis), Whorled Water-milfoil (Myrio-

phyllum verticillatum), Water Dropwort (Œnanthe fistulosa), Plantain-leaved Pondweed (Potamogeton plantagineus), Frogbit (Hydrocharis morsusranæ), Round-leaved Sundew (Drosera rotundifolia), Pyramidal orchid (Orchis pyramidalis), and a great many other good plants, many of which are more or less rare in the North. Of the land and fresh-water mollusca collected no report has yet been received.

EXCURSION TO MAGHERAMORNE.

The fifth excursion of the forty-third year of this flourishing Club was held on Saturday, July 29th, to Magheramorne. The weather in the early part of the day looked anything but promising, and fears were expressed that the usual luck of the Club had gone for once. But by noon it was evident that such would not be the case, and the sun shone out vigorously as if to make amends for the doubtful morning. Forty members and friends assembled at the Northern Counties Railway at 2-45 and took seats in the reserved carriages in waiting. Magheramorne was reached in due time, and the usually almost deserted station woke up to find itself invaded by a crowd of strangers bearing various weapons and impedimenta of uncanny and mysterious appearance. But the quiet and beauty of the scene must have softened the hearts of the invaders, for they passed out and took the road leading to Magheramorne House without doing any damage. By the kind permission of Colonel M'Calmont, M.P., the large party turned into the main entrance of the demesne of Magheramorne and ascended the steep avenue leading to the house. While Mr. A. R. Hogg photographed the party in front of the house the members were admiring the beautiful and well-kept grounds, more especially the luxuriant mass of creepers which completely covered the main entrance and front of the house and hung down in festoons, giving a grateful suggestion of coolness in the glare of the hot sun. Having thoroughly explored the attractive glen, the members slowly made their way back by a different route, and presently

found themselves in front of the house again. Here the head gardener took charge, and, opening many gates covered with fine wire netting to keep out the innumerable rabbits, conducted the party to the gardens, where the botanists were in their element. Those who were not botanists had plenty to admire in the view over Larne Lough, with Swan Island close at hand and the Chaine Tower at Larne Harbour in the distance, while the heavy clouds of black smoke coming from the turbine steamer Princess Maud, getting ready for her quick run to Scotland, gave an air of practical reality to the otherwise fairy-like scene. When the botanists had exhausted their vocabulary the back avenue was taken, and with many regrets they found themselves on the main road again. The extensive limestone quarries were next visited, where the geologists had ample opportunities of showing how well they could wield their hammers. Many treasures in the form of fossils were found, and carefully extracted from the rocky bed where they had lain undisturbed for so many thousands of years. Those who had come unprovided with the necessary tools had to content themselves with close investigation of the masses of broken debris, which were easy of access, but even these were able to knock out good specimens of Belemnitella mucronata, while Terebratula carnea only yielded to those with tools. When all had obtained sufficient specimens, the party adjourned to the Post Office, where light refreshments were waiting, and were partaken of in the open-air. Afterwards a short business meeting was held—the President (W. H. Phillips) in the chair—when several new members were elected. On the motion of Robert Patterson, seconded by F. Adens Heron, a cordial vote of thanks was passed to Colonel M'Calmont, M.P., for his kindness in allowing the Club to visit his glen and grounds. There was still ample time to examine the well-known deposit of estuarine clays at Magheramorne, and this the majority of members proceeded to do. The term estuarine clay signifies those deposits which have been accumulated in existing bays and estuaries since the close of the glacial period. It is often found in beds of considerable thickness, but at Magheramorne

the deposit is comparatively thin. Shells are abundant here in a wonderful state of preservation, and it is rich in foraminifera and very small shells. Many specimens were obtained and taken away. On this spit of land a member of the Club (Mr. F. A. Porter) called attention to a new local industry which is just being started there; in fact, the wooden pegs marking the levels were much in evidence. Mr. Porter stated that the Limmer Asphalte Paving Company, Limited, had found that the limestone at Magheramorne was the best suited for the purpose of manufacturing their asphalte, and consequently the Company have secured the sole right to the whole of the Magheramorne output for paving purposes. Works are being erected on this spit of land, where the paving blocks will be actually manufactured, the rock asphalte being shipped direct from France and Sicily, to be ground to powder, boiled in huge cauldrons, and mixed with bitumen and limestone. Thus a great deal of employment will be given locally. The members were much interested in Mr. Porter's account of what may be considered a local enterprise, and wished it every success. It being now train time, a move was made for the station, and the 8-20 train taken for Belfast, which was reached at 9-20. Among the less common plants found were the viper's bugloss (echium vulgare), white campion (lychnis vespertina), Mullein (verbascum thapsus), fleabane (pulicaria dysenterica), dyers' rocket (reseda luteola), square-stalked St. John's wort (hypericum quadrangulum). Land shells were not at all common, but helix intersecta was found in quantity over the spit of land referred to above, and hydrobia ventrosa is still in its old station. Butterflies were scarce, but the small white, the meadow brown, and the speckled wood were observed.

EXCURSION TO BALLINDERRY AND PORTMORE.

The sixth excursion of the season took place on Saturday, August 12th, when members and their friends to the number of fifty-six started in brakes from the Linen Hall Library at ten

o'clock. The weather was true to the traditions of the Club, and "Field Club weather" was ideally maintained throughout the day. The first halt was called at the Cathedral in Lisburn, where the Rev. Canon Pounden met and conducted the party over the building, and from the chancel steps explained its history, pointing out the many features of interest. This church is so well concealed from view by the town business houses that it seldom attracts the notice of the visitor to the town, but within and around the church walls there is so much connecting it with the building of the nation that cannot fail to be of interest that a few words regarding it may not be out of place. "The church called St. Thomas's Church stood on the site of the present building, and was eighty feet long, by twenty-five feet wide in the inside, with a porch at the south side. It does not appear when first built to have been furnished with a tower or spire, although from a memorandum in the registry of 6th April, 1674, stating that at that time 'the steeple was made new and a bell bought,' it appears that a spire was afterwards built. . . . It may be added that Lisnegarvey (now Lisburn) is called a chapelry in a registry of the year 1662, and that in a most minute terrier made out between the years 1604 and 1609, enumerating all the parishes and chapels belonging to the dioceses of Down and Connor, that name nowhere appears. In 1662 Lisburn received a charter from Charles II., and by that patent the church is made the cathedral and episcopal seat of both dioceses of Down and Connor for ever by the name of the Cathedral of Christ Church, Lisburn"—(S. Walkington). We gather from these notes that the church is close on three hundred years old, and successive alterations have brought it to its present arrangement of plan, &c. The spire was added in 1807. The church now contains some beautiful stained-glass windows commemorating the bishops of the diocese since 1660 and the rectors of the parish since 1628, and also a monument to the famous Bishop Jeremy Taylor. Another monument that must always be of interest is to Lieutenant Dobbs, who was killed in an engagement with Paul Jones, the founder of the American navy. This monument has a beauti-

fully sculptured panel showing the conflict of the two frigates in Belfast Lough, off Carrickfergus. A further monument that attracted considerable attention was one by the great Foley to the memory of General Nicholson, who was killed in India in 1857. Lord Roberts during his command in Ireland visited the Cathedral to see this memorial to his old commander. The chancel of the Cathedral has been recently erected, and in it are memorial windows to the late Sir Richard Wallace, to one of which his Majesty Edward VII. subscribed when Prince of Wales. Canon Pounden then exhibited the church plate, which dates from 1757, and some old prayer-books from the Dublin press of 1721, also the ancient charter of the Cathedral. In the church are many rural tablets to the Huguenots who, after the revocation of the Edict of Nantes, found a home in Lisburn, helping to create its trade, and they now, with many of their descendants, sleep around its walls in the churchyard. We must not forget to mention that the headless remains of Harry Munroe were interred here, but the actual site is lost; it is supposed to have been where the new chancel now stands. Henry Munroe was the leader of the rebel movement in June, 1798, and, being defeated at Ballynahinch, was caught, tried, and hanged in front of his own residence in Lisburn, then beheaded, and his head "piked" on the Market-house in the brutal custom of the age. After a repose of nearly three hundred years in a forgotten grave, time has discovered and honoured the remains of Paul Jones, and it would be hard to say that it has not a similar honour in store for Monroe and his band of enthusiasts. So much interest was aroused in and about the Cathedral that it was difficult to tear oneself away from it and its memories. Time, however, compelled the conductor to sound his peremptory whistle, when the Canon invited the party to the schools, where he entertained them to light refreshments, which were very welcome; and, with many expressions of thanks to him for his kindness and hospitality, the journey was resumed. The next halt was at Ballinderry, where the numbers were increased by members who arrived by motor, train, and cycle. The parish of Ballinderry

has had three churches—first, the pre-Reformation church at Lough Beg, which did duty till about 1664, when Jeremy Taylor built another and more central church, which in 1824 gave way to the present parish church. The second church, from its position between the first and last, became known as the "middle church." A brief visit was made to the present parish church, which contains the Royal arms of England, dating from the reign of Charles II., and was formerly hung in the middle church when Ballinderry had the distinction of being a garrison centre. The chalice of this church is also of interest, and is of beaten silver, and engraved on it is the following:—"The cwp of Balanderey Chwrch."

The next stoppage was at the middle church, which derives its interest from its connection with Jeremy Taylor, who built it, and from the fact that it stands as an almost solitary example of a Jacobean country church in Ireland. It still contains the old-fashioned "square" pews and the "three-decker" pulpit, which was considered an indispensable necessity almost down to fifty years ago. This church in 1897 was in the last stages of its decrepit old life, when the generous munificence of Mrs. Walkington, of Ballinderry, restored it as a free gift to the parish. The visitor will note the beautiful old Irish oak-work, the old brass candlesticks, the collecting "spoons," and many other relics of old-time customs and building construction. Again returning to the carriages, the drive was continued to the cross-roads, where a walk was commenced to the ruins of the pre-Reformation church of the parish. Here a halt was called, as one of the Club's former secretaries expressed it, "to make different arrangements for carrying the lunch."

This church was erected near the shores of Lough Beg—a small lake containing about one square mile of water, divided from the greater lake, Lough Neagh, by a neck of land about half a mile wide. It appears to have been built on an artificial island in the centre of a bog, surrounded by a fosse and lined with double hedges, which add wonderfully to the picturesqueness of the spot, and it is approached by a narrow road through the low-lying field. The church is now a ruin, and possesses

no feature of any interest from an architectural point of view. When it was decided to abandon it as a place of worship it was unroofed and dismantled, and the materials re-used in the erection of the middle church, where a great portion of the old oak rooftrees still remain. There is one grave in this yard that, like many others, has no headstone, but is never without its wreath and words of remembrance—and that is the grave of William Harbison, one of the misguided men who led the Fenian rising. This locality proved a good ground for botanists and conchologists, and while they were engaged sufficient time was at the disposal of many who went to explore the site of the old Portmore Castle, once the seat of Earl Conway, which lies about one mile north of the church.

The sandy shores of Lough Neagh and the adjacent marshy lands, extending to Portmore Lough, are famed as the homes of many of the rarer of our native plants. The district is especially rich in the paludal or marsh forms. Drainage and agriculture have caused the disappearance of some of these, but many remain to reward the persevering searcher. Amongst these may be mentioned the greater spearwort, which grows luxuriously by Lough Beg. The water parsnip (Sium latifolium) and the marsh vetchling (Lathyrus palustris) were found at Portmore more than a century since by Dr. Templeton. It is now over half a century since they have been seen there by Dr. David Moore. The frogbit is still to be found, and when in bloom is quite an ornament to the drains. The meadow thistle (Carduus pratensis) and the slender-leaved reed mace (Typha angustifolia) occur, and the very rare sedge (Carex stricta) is also to be found. The marsh fern, one of the rarest of Irish ferns, was found plentiful in Portmore Park and Wood by Templeton 111 years ago. It has not been met with recently, but was looked for carefully (S.A.S.). The margins of Portmore Lough and marshes near at hand are good collecting grounds for mollusca. The rare and local coil shell (Planorbis glaber) is plentiful in the lough. The swan mussel is sometimes abundant, while myriads of valvata and bythinia also occur. A good lookout was kept for large amber shells (Succinea) on

the lake margins, this species having grown rapidly this season. The marshes yield the tiny vertigoes, V. antivertigs, and V. substriata (R.W.). On the return journey all the members and friends were received by Mrs. Walkington at her picturesque residence, Oatlands, where she, with the assistance of Mr. and Mrs. H. Walkington, entertained them to tea. The cheerful hospitality was thoroughly appreciated, and the kind reception of the Club will not soon be forgotten by them. It might be mentioned that in the drawing-room at Oatlands a beautifully carved model in Irish oak of the high cross of Monasterboice, by Robert May, attracted much notice, and gained the artist much and well-merited praise. Before leaving Oatlands a business meeting of the Club was held on the lawn, when a resolution was carried conveying to the President, Mr. W. H. Phillips, the deep sympathy of the Club in the loss he has sustained by the death of his wife. A most hearty vote of thanks was then passed to Mrs. Walkington and Mr. and Mrs. H. Walkington for their kind hospitality, and was gracefully responded to by Mrs. Walkington. At half-past five the homeward journey was commenced, and in due time Belfast was reached, terminating a most successful day.

The ornithologists of the party reported having observed four species of the antidæ—viz., the mute swan (of which twelve were on the lake), mallard, shoveler, and tufted duck. A great crested grebe with its brood was seen diving and swimming about, as well as numerous little grebes, locally known as "tam puddins." The day was rather unfavourable for ornithological observation, being somewhat windy; besides, at this season almost all of our birds are silent, and many of them are now undergoing the moulting process, and consequently keeping in retirement, but during the day thirty species were noted on and about the lake. A flock of ten missel thrushes was observed, but only one song thrush and one blackbird. It is rather remarkable that neither a meadow pipit, a reed bunting, nor a starling was seen, though on previous visits to this locality those species were always noticed in profusion. A member collected some caterpillars of the cinnabar moth (Euchelia jacobæa),

which were feeding on ragwort (Senecio jacobæa), and numerous butterflies and moths were brought away for examination. A wasp's nest in perfect condition was entrusted to the conductor by Canon Pounden for the museum of the Belfast Corporation in Royal Avenue. The Vice-President's prize for the best collection of wild flowering plants was won by Miss Courvoisier, who gathered eighty species.

EXCURSION TO KNOCKAGH.

The seventh excursion of the summer session should have taken place on Saturday, August 26th, when Knockagh was to have been visited by the Club for the study of the botany and geology of the neighbourhood. Owing to the unfavourable weather only one member met the secretaries at the railway station, and under the circumstances the excursion was postponed indefinitely.

EXCURSION TO CHURCH HILL, COUNTY ARMAGH.

The eighth excursion of the summer session of above Club took place on Saturday, September 9th, the place selected for visitation being Church Hill, Co. Armagh. Despite the unpromising appearance of the morning, eighteen members and friends took their places in the compartments reserved for them in the 9-50 train (G.N. Railway) from Belfast, and on arrival at Portadown were pleased to find that they had passed out of the rain zone and that they could commence the drive of about eight miles to their destination in brilliant sunlight. Several members and friends were awaiting their arrival at Portadown, and, brakes being in readiness, all were soon comfortably seated and the word given to drive on.

The first stopping-place was at the works of the Irish Peat Development Company, Limited, near Maghery, where they were received by the Managing Director, Mr. Herbert Garnett,

A.M.I.Mech.E., who courteously conducted them over the place and graphically described the processes employed in the manufacture of the various articles marketed by this enterprising firm. It is gratifying to find an industry of this kind flourishing in our country, while the up-to-date methods employed and the energy and resource displayed augur well for its prosperity. Mr. Garnett informed them that the works had been started some three years ago, and that they had an area of 160 acres of bogland, through which a miniature railway, 1¾ mile long, had been constructed to bring the peat to the works and warehouses, which are situated close to the road leading from Maghery to Dungannon. The party were first conducted to the terminus of the railway, where they found a 6-h.p. petrol motor, with two trucks attached, and into these they clambered, and were soon speeding across the bog, the novelty of the experience proving a source of much merriment. Having reached the further terminus, the motor was reversed, and on the return journey they stopped adjacent to where the peat-digging operation was proceeding. Here they saw the process of manufacture of peat fuel, the various technicalities of which were lucidly explained by Mr. Garnett. The upper layers of the peat, being unsuitable for fuel, were removed, and a trench was cut down to the underlying marl and terraced up one side. Here an elevator is erected which is fed by a spading taken alternately from the ascending terraces, and this material is conveyed to a macerating machine, which thoroughly disintegrates and mixes together the layers of different densities and delivers the product through two orifices in a constant stream. As these streams emerge from the macerator they are cut into lengths of about a foot, and carried on boards to be spread out to dry. The peat at this stage contains about 80 per cent. of moisture, but after the thorough maceration this rapidly evaporates, and in about a month the fuel is ready for market. These machines, which are driven by electricity conveyed by a cable laid from the factory, are capable of dealing with 16 tons of the dry fuel per day. Having seen this process, the party returned to their "illigant motor car" and soon reached the factory, where they

were shown the manufacture of peat moss litter, so extensively used for bedding horses. The more fibrous layers of the peat are conveyed by an elevator to a screening machine, which sifts out the finer particles and delivers the suitable parts to powerful presses. On the floor of the press are placed three laths, one at each side and one in the centre, and the material is delivered on these till the space is filled up, then three laths are placed in similar positions on the top, and the whole subjected to great pressure. When the requisite pressure has been obtained the bales are tied transversely to the laths by wires, the pressure is released, and the bale is removed from the press. The laths used are cut on the premises by a large circular saw, which is also used for cutting up the bog oak found in the peat. This bog oak, when cut, is carefully stacked to dry, a process requiring about twelve months, and for this product a ready sale is found. The fine dust extracted in the litter-making is exported to the Continent, where it is extensively used for fruit-packing, its antiseptic and non-oxidising qualities rendering it a valuable material for this purpose. The motive power in the factory is supplied by a twin-cylinder horizontal steam engine, working at about 100 indicated horse-power, and steam at a pressure of 60lb. per square inch is generated in a boiler in which is burned all the refuse peat. Peat fire-lighters and peat charcoal are also manufactured, and samples of these were shown to the party, as well as of the different substances which can be chemically extracted from the peat. Attention was also directed to some butter, weighing five pounds, which had been found in the bog at a depth of three and a half feet. This had evidently been packed in a wicker basket, but the fragments of the covering soon crumbled away on exposure to the air. They also saw two silver coins, a florin and a shilling, bearing the date 1567, which had been unearthed from the bog about three feet below the surface. Previous to leaving the premises a cordial vote of thanks was voted to the Messrs. Garnett for their kind courtesy, and the wish was expressed that this undertaking would prove lasting and profitable. Mr. Garnett expressed the pleasure the visit afforded him, and, farewell greetings having

been exchanged, the vehicles were remounted and the drive resumed. On arrival at Church Hill, the residence of Mr. Henry Verner, who had kindly granted permission to explore his demesne, the members seated themselves on some felled trees on the lawn, lunch was partaken of, and the party were proceeding to explore the place when the arrival of fourteen members of the Tyrone Field Club was announced, and, after an interchange of courtesies, all mingled together to pursue their different investigations. Church Hill is noted for the great nests of the wood ant (formica rufa) which abound in the pine woods beside the lake, and most of the members wended their way thither. This is the largest of our native species of ants, the winged males and females measuring not far short of half an inch in length, and the two kinds of workers being respectively about one-fourth and from one-fifth to one-sixth of an inch long. The "ant hill" or nest is made up of fir needles, together with all sorts of plant fragments, the largest here seen being roughly oval in shape, and measuring about ten feet long by five feet broad, and about two feet in height. The vicinity of the nest is trodden down into a number of "ant roads," which are the scenes of much busy coming and going. The larger workers are principally concerned when outside the nest with collecting building materials, while an important duty of the smaller workers is to collect the "honey-dew" of aphides. The substance in question is a sugary fluid that exudes in considerable amount from certain glands of these little creatures, from whence it is collected by these workers and conveyed to the larvæ and the adults, who have been meanwhile engaged with the internal economy of the nest. The food is by no means limited to honey-dew, but is of a very mixed nature, for caterpillars, various adult insects, and miscellaneous vegetable matter all figure in the bill of fare. The ant hill is literally riddled with labyrinthine galleries expanding at intervals into rounded chambers, and for some depth the underlying ground is mined with passages continuous with those above. The most important and arduous duty of the workers is to look after the eggs, larvæ, and pupæ, and these are dis-

tributed through the nest with due regard to variations of moisture and temperature, since both these affect development. When the larvæ hatch out they are fed and tended till full grown; they then spin cocoons, within which they become pupæ, and when the perfect insect is ready to emerge the workers bite away the enclosing cocoon. Some of them are workers, others winged males and females, which fly about in swarms. After mating, the large majority of the swarming individuals perish, but some of the females survive to found fresh communities, or sometimes to be taken into existing nests. The stings of wood ants are not sufficiently developed to be of use, but their poison-bags contain formic acid, which can be squirted to a considerable distance, and is an effective defence. After examination of the ant hills, the members dispersed among the woods and round the lake till five o'clock, when the return journey was commenced. The botanists of the party reported the following among the more interesting plants observed:—Centaury (Erythræa centaurium), yellow loosestrife (Lysimachia vulgaris), gipsywort (Lycopus Europæus), skullcap (Scutellaria galericulata), dog's mercury (Mercurialis perennis), reedmace (Typha latifolia), and Equisetum sylvaticum. Ferns were found growing in profusion about the margins of the woods, principally the lady fern (Athyrium filix-foemina), the broad buckler fern (Lastrea dilatata), and the hand fern (Blechnum spicant), and many species of fungus were collected for further examination. The ornithological members had a list of 29 species of birds noted, among them being four of the summer visitants—wheatear, willow-wren, swallow, and sand-martin—which have not all left this country as yet. At Annagarriff Lake a flock of cormorants was observed, which was estimated to consist of about 100 birds. Some fine specimens of dragonflies were noted, and several butterflies and moths, all of which proved of common species. Only one species of the mollusca was reported, one of the coil-shells (Planorbis), but none of the members present were experts in conchology; and this excursion presented a feature, probably unique in recent years, in the utter absence of

cameras. Tea was served in Ye Anchor Cafe, Portadown, several of the local ladies kindly attending to see that all proper arrangements had been made for the comfort of the visitors. After tea a short business meeting was held—the Vice-President (Mr. Robert Patterson, F.Z.S., M.R.I.A., M.B.O.U.) in the chair—when, on the motion of Mr. N. H. Foster, M.B.O.U, seconded by Mr. John Hamilton, a vote of thanks was accorded to Mr. H. Verner for giving permission to explore his grounds, and a new member was elected. The Secretary announced that it was arranged to hold the Conversazione in the Exhibition Hall, Belfast, on 17th October, and it was hoped that members would contribute to its success by exhibiting such articles as would prove of interest. The President had offered a prize for the best collection of plants made during the day, and this was awarded to Mr. W. H. Robinson, who handed in a collection of 71 species. The 7-30 train from Portadown conveyed the members to Belfast, where they separated at 8-15, and thus came to an end the summer session of the forty-third year of this flourishing Club.

Winter Session.

NOTE.—*The authors of the various Papers of which abstracts are here appended, are alone responsible for the views expressed in them.*

ANNUAL CONVERSAZIONE.

The Forty-third Winter Session of the Club was inaugurated in the usual way by a conversazione on the evening of Tuesday, October 17th. This was held in the Exhibition Hall, which was tastefully decorated with plants, and for which our thanks are due to Mr. M'Kimm. There was a large attendance of members and friends, over four hundred being present, and among whom were representatives from the Tyrone and Dublin Field Clubs. Tea was dispensed from seven to eight o'clock, the ladies who kindly presided at the tea-tables being—Mrs. Courvoisier, Mrs. R. A. Dawson, Mrs. N. H. Foster, Mrs. Gallway, Mrs. W. A. Green, Mrs. H. L. Orr, Mrs. Robert Patterson, Mrs. Vinycomb, Mrs. Wheeler, and Mrs. J. Wright. During and after the tea the exhibits received well-merited attention, and there was always a little crowd round each of them. While every exhibit was of interest, yet there were several that were very attractive to people whether Naturalists or not. Such were Professor Wilson's exhibit of living marine animals, such as crabs, fish, &c.; Mr. Sharman Neill's beautiful exhibition of silver; Mr. Dawson's exhibition of pottery, which showed what could be done in the direction of making pottery locally. The full list is as follows:

BOTANY.—N. Carrothers, some rare plants from Down and Antrim, collected in 1905; C. M. Cunningham, specimens

illustrating growth of Himanthalia lorea or Sea Strap; J. H. Davies, a brick covered with a rare moss, Weisia calcarea; G. Donaldson, plants of North America (from Compositae); W. Gray, M.R.I.A., microscopical sections of plants; W. H. Phillips, varieties of Polystichum angulare; R. Ll. Praeger, B.E., some rare plants collected last season in Clare, Mayo, Leitrim, Cavan, and Monaghan; J. Strachan, specimens of Fungus, Peziza adae; Rev. C. H. Waddell, B.D., mosses and liverworts from Co. Down.

Geology.—R. Bell, liassic fossils; C. Bulla, ores and minerals from Laxey mines, rocks from Carlingford; G. C. Gough, various limestones under the microscope, fossils, minerals, &c.; J. L. S. Jackson, lepidodendron; De Witt Hinch, shells from high level glacial beds, Co. Dublin; J. Strachan, dendrites and micro-crystals.

Zoology.—S. S. Fausset, tropical bird-skins from Australia; Rev. G. Foster, collection of Irish butterflies and moths made during past season; N. H. Foster, M.B.O.U., down from nests of anatidæ (12 species); W. H. Gallway, snakes from Singapore, mongoose; W. A. Green, badger and stoat mounted by exhibitor, butterflies and moths; J. N. Milne, land and fresh-water shells, moths; H. L. Orr, butterflies, moths, beetles, and shells; Miss Steele, marine shells from Malahide; A. W. Stelfox, land and fresh-water mollusca from W. Donegal; Professor Gregg Wilson, D.Sc., living marine animals, microscopic preparations; R. Welch, M.R.I.A., land and fresh-water mollusca, and carinated buccinum undatum; J. Wright, F.G.S., foraminifera from Rockport, Belfast Lough.

Miscellaneous.—Thomas Brown, amethysts from Achill Island, mounted and unmounted; Ballycastle Toy Industry, toys, &c., made by peasant children; R. A. Dawson, A.R.C.A. (Lond.), specimens of clay and gypsum from Co. Antrim, and specimens of simple pottery suitable for local industrial development; F. C. Forth, A.R.C.Sc.I., meteorological charts, model of tubular bridge at Gobbins; C. Hilland (of Dundalk), punch bowl of Dundalk Volunteers, 1782; J. L. S. Jackson, old wooden water pipes recently dug up in Donegall Street; Mrs. Letts,

penal candlesticks; Sharman D. Neill, replicas in silver of old Irish cups, methers, &c., showing Celtic ornament; W. H. Milligan, casts of Crumlin and Middlesbro' meteorites; Miss J. Moore, toys made by Cushendall peasants; H. M. Robb, peat, &c., from the Irish Peat Development Company, Maghery; W. H. Robinson, some scarce Irish coins; R. Welch, M.R.I.A., Natural History photographs.

Microscopic Demonstrations by Messrs. Gray, Gough, Wright, Professor Wilson, and others.

Visitors and the non-working members were greatly struck with the neat and tasteful way many of the exhibitors had mounted their specimens, making them not only useful but beautiful works of art.

At half-past eight a short business meeting was held, the President (Mr. W. H. Phillips) being in the chair. In the course of a brief speech he reviewed the work of the Club during the past year. He said the seven excursions held during the summer months had been well attended, the average number present being sixty. The clubroom at the Museum had been largely availed of for the Wednesday night meetings, and it was hoped that similar success would distinguish these gatherings during the coming winter. The membership of the Club was now over four hundred. (Applause.) This year they had to lament the deaths of three of their members, including Mr. John Anderson, J.P., who was connected with the Club for nearly forty years; Sir James Haslett, M.P., and Mr. C. J. Lanyon. Referring to the scientific value of the Club's excursions, the President said during the past two years Mr. W. Porter and he had searched the slopes of the Mourne Mountains on all available occasions, and that evening there was among the exhibits a variegated Blechnum spicant, found by Mr. Porter. This was the best variegation known of that fern. On the excursion to Tollymore on July 1 some plants of Pteris aquilina were found, very beautifully variegated; while on September 23 a plant of Blechnum cruciatum was discovered. The Mourne Mountains seemed to be the only habitat in the kingdom where this plant had been found. Proceeding, he said he would like to call the

attention of the members to the effort that was being made to obtain funds for the better equipment of Queen's College, a movement which he earnestly trusted they would do their best to promote. (Applause.)

The following new members were then elected:—Mrs. M'Crum, Miss Riddell, Mr. S. Weir, and Mr. A. Bullock. A number of lantern slides were then exhibited by Mr. Hogg, which had been prepared by various members, and which were mostly taken on the Club's excursions. Some of the Dungannon excursion were described by Mr. Welch, M.R.I.A.; of the Gobbins' excursion by Mr. Fennell, M.R.I.A., and Mr. Farrington; the Diamond Rocks and Newcastle excursion by Mr. N. H. Foster and Mr. Farrington; the long excursion to Dundalk by Mr. Donaldson, who also described the views of Churchhill and the Peat Development Company's works at Maghery. Mr. Green exhibited and explained some views of Bundoran, and also an interesting slide showing the spot where pre-historic urns had been found near Belfast, and which had been kept secret till that evening. The exhibition was concluded by Mr. Hogg showing some splendid photographs of the recent eclipse of the sun and some views of Downpatrick Cathedral, after its recent restoration, including one or two of the carvings at the top of the pillars, taken with a telephotographic lens. After the meeting and lantern display, which concluded at 9-30, members returned to the ordinary exhibits, and they were able to spend another hour examining these before the conversazione concluded.

"REPRODUCTION IN FERNS."

The first ordinary meeting of the Winter Session was held on Tuesday evening, November 21st, when the President (Mr. W. H. Phillips) gave his inaugural address before a good attendance of members. Prior to his address, however,

Mr. R. Welch, M.R.I.A., showed sections of, and described, the raised beach then exposed by the road-widening

operations for the electric tram at Mount Vernon, Shore Road. The section is of interest, as the first noticed on the Antrim side of the Lough of any considerable height, south of Kilroot point. It seems, however, to be higher than the latter above the sea, as it rises on the north side of the large dyke, which here penetrates the Triassic sandstone to about 23 feet above the sea; while the raised beach gravels at Kilroot do not exceed 14 feet above high-water mark. The Belfast section has also on it those rude worked flints, for which Kilroot has been long famous, and a very black earthy zone, containing flint flakes, charcoal, and oyster shells, seems to be the remnants of a prehistoric kitchen-midden, an interesting find well within the city boundary of a large manufacturing town like Belfast. Mr. Phillips then began his lecture, and said—"For too long a time Ferns had been well-nigh neglected amidst the varieties of vegetation which embroider the earth. No gaudy flowers do they wear to win the admiration of wandering eyes and the cultivation of fair hands. They are content to grow unseen, save by the eye of the adventurous explorer of mountain and valley, of fastness, fell, and waterfall.

Ferns, Lycopods (club-mosses), and equisetae (horse-tails) have come down to us from a period of the world's history when flowering plants had not even begun to appear. Although appearing still earlier, it was in carboniferous times, when the greater portion of our coal was formed, that ferns attained their zenith, owing probably to the warm, moist climate that the north-west of what became Europe then enjoyed, and the whole of the then land became quickly clothed with ferns and magnificent trees. Amongst the buried forests of carboniferous age, 500 varieties of this vegetation are found, tree-ferns and club-mosses hardened to stone. Ferns are there to be seen in astonishing variety, and of very different sizes. Some resembling the bracken of the woods grew into trees of large dimensions, bending with flowing leaves; others remained lowly, like the ferns that flourish in our vales to-day. Gradually these ancient forests sank beneath the floods of sea water, and settling into the sand and mud of the sea bottom have been transformed by

time and pressure and heat, into the black shining coal seams, which now reveal their history and treasures to our curious eyes.

Plants are divided by botanists into two great classes, the flowering and flowerless, or, as botanically expressed, phanerogamic and cryptogamic. In the one class flowers are produced which are followed by seeds formed on the parent plant. In the other there are no parts produced corresponding to flowers. The stem bears leaves only which have the property of forming for the purpose of reproduction a peculiar form of germ bud, to which the name of spore has been given. To this class ferns belong. They are distinguished from other plants in the same class by the nature and position of the cases in which the spores are contained. These spore cases are formed on the back or margin of the leafy portion or frond, and in some on spikes. The vegetative organs of ferns are the root, the stem, and the frond or leafy part. The roots are always fibrous, and in their younger portions are covered with fibrils or soft hair-like bodies, which give them a downy appearance. The stems are often erroneously called the roots, and assume two forms called the caudex and the rhizome. In the caudex or caudiciform stem the fronds rise from the termination of the axis of growth either in a single series or in a kind of crowned whorl, so as to form a terminal crown. The young fronds in all cases spring from the inner side of the previous fronds, their bases becoming united, so that the older part of the stem consists of a combination of the axis of growth, with the basis of the fronds developed from it. In British ferns this is well seen in old plants of Lastrea Filix-mas. In the Rhizomiform stem the fronds, which are more or less scattered, are developed from the sides of the axis of growth, which appears to be in advance of the last-formed fronds. The Polypodium vulgare forms a good example of this mode of growth. The leaflike organs of ferns are called fronds. The frond differs from the leaf of the flowering plant in that it actually bears on its surface the parts known as fructification, which the true leaf does not. The fronds of almost all ferns are in their incipient condition coiled up inwards towards the axis of development, forming a

series of convoluted curves. This peculiar form of vernation is called circinate. Almost all our British ferns have this mode of growth. The stipes is the stalk, and the lamina the leafy portion. The name of frond is usually given to the upper leafy portion, irrespective of the stipes, which really forms part of it. The leafy part affords great variety in the mode in which it is divided. Some fronds are simple or undivided, as in Scolopendrium; others again are variously divided, and are named according to the degrees of division. In the majority of ferns, the mature fronds are alike fertile, and are similar in appearance, but in certain species the habit is to produce some of the fronds wholly barren, and others wholly fertile; the fertile fronds are more or less contracted. The Blechnum spicant is a good example of this form. The reproductive organs of ferns consist of spores, enclosed in spore cases, these spore cases being collected into groups called sori. The shape and position of the sori form a very distinguishing feature in determining the species. In most British ferns the sori are borne on the back of the fronds. To this there are variations. The spore cases of the greater number of known species are small, rounded or obovate, hollow, laterally compressed, one-celled bodies, nearly surrounded by an elastic ring or belt. The spores of ferns are minute, roundish, angular or oblong vesicles, consisting of two outer layers enclosing a thickish granular fluid. They are very numerous, and arranged without order within the spore cases. So small are they that when thinly scattered over a sheet of paper, they are scarcely visible to the naked eye.

The spore consists of a single cell, very tiny, of various shapes in the different genera of ferns, and with various markings, and sometimes plain, and either smooth or bristling with little points. From the part of this minute germ cell which happens to be downwards proceeds the root, whilst from its upper part proceeds the frond. When the spore has fallen into a congenial position for germination, the process of development begins by the enlargement and multiplication of the cell of which it consists. This cell be-

comes divided after a short time, and becomes an aggregation of little cells, which take the shape, when expanded, of a minute patch, like a tiny leaf laid flat on the ground. This leafy scale is mostly irregular in shape, and usually somewhat round or heart-shaped, green in colour, and named a prothallus, from two Greek words *pro* before, and *thallus* a young shoot. Under the prothallus, which attaches itself to the earth by fine rootlets, other cells begin to be produced. These are of two kinds, and produce respectively the sperm cell and the egg cell, and with these commences a new life history. The germ must be fertilised before it can commence the process of development. The sperm cell breaks up into minute active, thread-like bodies, called spermatozoids. When it is ripe the ovum or egg-cell, which is at the bottom of a flask-shaped mass of cells called the Archegonium, is put into communication with the exterior by the breaking down of the cells into mucilage, and this mucilage has the power of attracting the spermatozoids. The latter are set free by the action of water on the organ, the antheridium, in which they are contained, and they swim about in a drop of the water on the prothallus until they reach the egg-cell, with which one unites. This process is called "fertilization," and the resulting cell by subdivision gives rise to a new fern plant. Thus a spore gives rise, not to a fern plant, but to a prothallus, which, in its turn, produces cells which gives rise to a fern plant. This is what is known as "alternation of generations." The young fern plant grows up through the prothallus, which soon rots and disappears. Steadily the process of development continues, until a tiny fern is produced, whose form and habit begin to assume a likeness to the parent plant. In most ferns, the process of development is very slow, several years being occupied before it is completed.

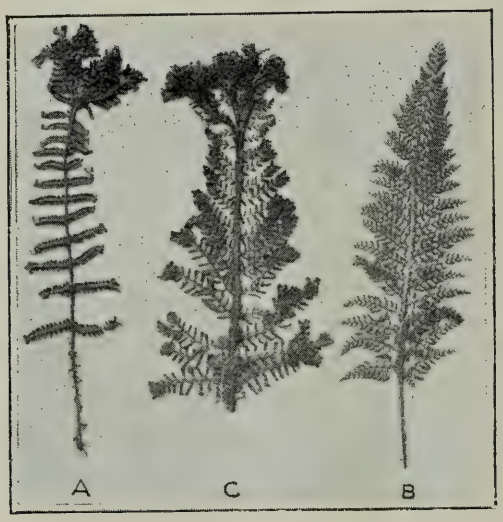
To recapitulate:—On germination,each spore gives rise to a prothallus, and leads quite an independent existence. The prothallus is a flat, green, heart-shaped body, sometimes as much as half an inch in diameter, attached to the soil by the root hairs which arise from its under surface. Prothalli may be found in abundance covering the damp ground where ferns

are growing. In ferns the same prothallus usually bears both kinds of sexual organs. The antheridia and archegonia produce an embryo, which eventually grows up to be a new fern plant. In ferns then we have a perfectly sharp alternation of generations. The fern plant is the sexual generation or sporophyte, producing the sporangia, and ultimately the spores. The prothallus is the sexual generation, producing the antheridia and archegonia in which the sexual cells are developed.

Ferns were a puzzle to the ancients and the early botanists, who could not understand how they were propagated. The spores, or as they would suppose them seeds, were so minute as to be invisible. Young plants were seen growing around the parent plants. No wonder if the spores were invisible, it came to be believed the possessor of them would also be invisible; and very great ceremonies were performed by those who went to gather them. Shakespeare, in Henry IV., makes Gadshill exclaim, when being advised to take heed lest he should be caught, "We have the receipt of fern seed; we walk invisible." This would almost infer that ferns and their peculiarities were taken notice of even then, or such a passage would not have been intelligible to a mixed audience. When the microscope came into use, the spores could be observed, and were found to be of different forms, and recorded in 1669. In 1715 it is mentioned that fern plants were raised from these invisible seeds at the Oxford Botanical Garden. However, little was known until Count Simenski, a Polish botanist, discovered one of the sexual organs in 1844, and in 1846 the other. To elucidate his researches, he published that marvellous set of illustrations, self-explanatory, about that time, of the first full demonstration of the normal life-history of ferns, the final link of which he discovered in 1846. I have the pleasure of showing some of these illustrations, which have been made into slides.

The discovery of the mode of fructification opened a new leaf in botany. Some of the Fern Hunters, who had found good wild finds, began to sow spores, and in order to economise space, sowed various varieties in the same pan, and when they


BRITISH MUSEUM
NATURAL HISTORY



Var. Divisilobum Crawfordiae. Result of crossing A and B. *Var.* Grandiceps.



Var. Lineare. Result of crossing A and B *Var.* Polydactylum.

Varieties of Polystichum Angulare with result of crossing.

grew to the frond stage, to their surprise they found that strange forms had sprung up, different forms had crossed, combining two or more characters in one plant, the spermatozoons having travelled from their own prothallus to neighbouring ones, thus fertilising them. When this had been discovered and tested, special sowings were made of mixed spores of well-marked characters and the products carefully noted, the result being the union of different characters on one plant. (Plate XV.). Some of the sowings of the late Mr. E. J. Lowe of Scolopendrium showed multiple parentage, some two parents, some of more, and even to as many as six parents.

A short description then followed on some of Nature's short cuts in propagation of ferns by bulbils on the fronds and rhizomes by buds, and by apospory and apogamy, &c.

The lecture, which was illustrated by numerous lantern slides, two of which are reproduced, was well received by the audience. The election of three new members concluded the meeting.

"BIRD WATCHING."

The first of the Wednesday informal meetings this session was held in the Clubroom, on November 29th, when Mr. N. H. Foster, M.B.O.U., gave a talk on "Bird Watching." The chair was occupied by the Vice-President (Mr. Robt. Patterson, M.R.I.A.), who, in introducing the lecturer, said these formal Wednesday meetings were chiefly intended to induce the younger members of the Club to make their first appearances as readers of papers, and so pave the way for longer papers in the future.

Mr. Foster said there was no reasonable doubt that birds had been evolved from a reptile form previous to or during the geologic period known as jurassic, in the rocks of which the remains of the oldest known bird, the Archæopteryx, had been discovered. This bird, as well as some of the other ancient fossil species, displayed many reptilian characteristics, which had long since disappeared from birds as we find them to-day.

After briefly contrasting the flight organs of mammals and reptiles with the highly specialised wings of birds, and pointing out the paucity of fossil birds discovered, he proceeded to give some practical hints on bird-watching, or field ornithology. For the pursuit of this study, the only requirement, in addition to the eyes and ears with which nature has endowed us, is a good field-glass, by the aid of which birds can be closely observed at a considerable distance, for so wary are some species that it is almost impossible to approach them so closely as to be able to follow their movements with the unaided eye.

Correct identification was imperative if the observations were to be of any value, and the lecturer gave some general directions as to how the different species of birds might be distinguished. Size, shape, colour, characteristic actions, sound emitted, as well as the physical features of the bird's habitat, applied singly or collectively, were the main aids to identification in the field, and examples were cited of the characteristic differences by which many of our native birds might be recognised. In this pursuit quiet patience and solitude were very desirable, as when a number of people are walking about birds, as a rule, will be frightened, and remove themselves from the vicinity of what is by them considered a source of danger.

Mr. Foster remarked that it was strange that many species of birds common in Great Britain were either unknown or only recorded as accidental stragglers to Ireland. Many a rare wanderer to our island undoubtedly escaped notice, and he urged the importance of having every bird, which the capturer might consider rare, submitted to a local expert with full particulars as to when and where it had been obtained. In conclusion, he said he would like to have a reliable observer resident in each area of say 20 to 30 miles in our country, who would chronicle from month to month the various species of birds observed in his district. Such records kept regularly all over the country would prove invaluable in the correct compilation of our avifauna.

The Vice-President mentioned some extraordinary results of watching bird-migration off the West Coast of Scotland this

autumn, that hitherto very rare visitor, the Lapland Bunting, having been obtained in large numbers. Messrs. Gough, Orr, Gallway, and May continued the discussion.

"BIRDS' NESTS."

The second informal Wednesday meeting of the session was held on December 13th, when Professor Gregg Wilson, D.Sc., F.R.U.I., gave a lecture on "Birds' Nests," the Vice-President (Mr. R. Patterson, F.Z.S.) being in the chair. Owing to the largeness of the audience, the meeting had to be held in the large room of the Museum, instead of the Clubroom, where these informal meetings are usually held. The lecture, which was most interesting, was illustrated by a beautiful set of lantern slides, mostly prepared from photographs taken by a former pupil of the lecturer. In the course of his remarks Dr. Wilson said—"The normal bird provides a nest to serve as a hatching chamber for its eggs and a nursery for its young; but a number of species shirk this duty. Thus the guillemot and razor-bills lay their eggs on bare rock; the stone-curlew places its on the unprepared surface of a field; the oyster-catcher lays on the open shore. Yet in all these cases there is a certain amount of protection provided for the egg. The shape of the guillemot's egg keeps it from rolling into the sea; the carefully-selected cranny in which the razorbill places its egg gives greater security; the stone-curlew evidently chooses its laying ground for safety, and returns to the same spot year after year; and the oyster-catcher's eggs are protected by their resemblance to the stones among which they lie. The cuckoo does not build, but its eggs are laid in another bird's nest, and cared for by a foster-mother.

Nests are formed in different environments, and of varied form and materials. The nests of lark, meadow pipit, snipe, pheasant, and partridge are on the ground; those of sand martins are in burrows, while many nests are in bushes or trees.

The elevation of a tree gives a certain security, as is illustrated in the case of pigeons' nests, which are mere platforms, and not lined with non-conducting material. Safety that results from concealment is also obtained by the habit of building in trees and bushes; but birds can be educated to neglect such precautions, and many acquire a practice of building in most exposed sites. The goldfinch's and the thrush's nests illustrate the cup-shaped variety; the willow wren gives us an example of the domed kind, and the coot sometimes shows an admirably-constructed passage-way leading to its home. Gannets and kittiwakes make their nests largely of sea weeds; some birds use only vegetable materials in the construction of their nests, while others use, in addition, feathers, hairs, &c.

The rooks in building in colonies illustrate a peculiarity found in a number of birds; while the moor-hen, which flits with eggs or young when necessity arises, gives us an excellent example of maternal care among birds.

After the lecture, the Vice-President, Messrs. N. H. Foster, W. H. Workman, and C. M. Cunningham made remarks on the subject of the lecture, and commented on the beauty of the slides. Dr. Wilson having replied, the proceedings closed.

"A WEEK IN INNISMURRAY."

The usual monthly meeting of this Club was held in the Museum, College Square North, on Tuesday, December 19th, at eight o'clock—the President (Mr. W. H. Phillips) in the chair. There was a large attendance of members and friends. The lecturer was Mr. Francis Joseph Bigger, M.R.I.A., the subject being "A Week in Innismurray."

Before proceeding with his lecture, Mr. Bigger made a few remarks on Lough Neagh pebbles, specimens of which were exhibited, pointing out the extreme beauty of these stones, which might almost be considered precious, and the desirability of their utilisation for ornamental decorative purposes. He

then threw on the screen slides of the restored cross at Camus, near Coleraine. The shaft of this cross had been formerly used as a gate pillar, but with the assistance of antiquarian friends it had now been restored and set up on its old base in the adjoining churchyard.

The lecturer then proceeded with his subject proper, recounting the history of this little historical island, lying off the coast of Sligo, about halfway between Bundoran and the town of Sligo. The ruins existing on the island consist of a Cyclopean cashel dating from pre-Christian times, numerous churches, beehive residences, altars and holy wells, dating from the earliest years of Christianity in Ireland. These were described at length, with the customs and habits of their builders and those who used them for centuries. This island, with its ruins, is one of the most interesting along the whole western seaboard of Ireland. Being so isolated, it is out of the reach of the ordinary tourist; and, its inhabitants having always had a sacred regard for its numerous ruins, they have been wonderfully preserved to the present day. The little church of St. Molaise, which doubtless dates from the sixth century, has been in continual service ever since, and is the one still used at the present time. The old graveyards are still used by the islanders, and the old wells of the early Celtic saint still supply their needs. The lecturer related some of the many legends and stories that still abound on the island, and then proceeded to detail the occupations and customs of the present inhabitants. There is no clergyman, doctor, policeman, or other official on the island, nor do their services seem to be very much required, as the people are highly moral and religious, and very little sickness occurs amongst them. The houses are frugal in the extreme, but cleanly and comfortable, and the pinch of poverty is not very great. There are thirteen inhabited houses on the island, the total population being about seventy-three persons. The lecturer also described the scenery of the island and its geological construction, the fine sandstone cliffs of some of the outlying rocks forming an excellent resting-place for the numerous seals which inhabit these waters. The ad-

dress was illustrated throughout by an exhaustive series of lantern slides depicting the natural features, the antiquarian remains, and the ethnography of the island. The lecturer closed with a most suitable illustration for this season of the year by describing a custom which still prevails amongst all the inhabitants of lighting a candle on Christmas Eve and placing it in the window, leaving the door ajar so that the Divine Visitor may enter and find rest—a deeply religious rite to commemorate the refusal of shelter in the inn of Bethlehem, when the Divine mother had to take shelter in the stable—it being the wish of every islander that the Madonna and her Child should see the light in his house and enter through the open door.

A novelty was introduced at this meeting by the lecturer calling on a friend of his (Mr. Hughes) to reproduce one of the ballads sung on the island. Mr. Hughes sang this very sweetly, and gave great satisfaction to the audience.

The proceedings then concluded.

"PREHISTORIC MAN."

The third Wednesday evening meeting of the above Club was held on January 3rd, 1906, in the Museum, College Square North. The Vice-President (Mr. Robert Patterson, F.Z.S., M.R.I.A.) presided, and there was a large attendance of members. The paper to be read by Mr. Alex. Milligan was on "Prehistoric Man," and this wide field was covered in an interesting manner. In the course of a brief review of the life forms of the past Mr. Milligan pointed out the progressive character of the types that characterise the three great divisions of geological time. Coming to the Tertiary period, he said that in it the climate and other conditions of land life were eminently favourable, and here we accordingly find nature producing lavishly. Mammalian forms were plentiful, and had great scope for multiplication and development. This great productiveness in the higher forms would, however, at a later stage lead to

keen competition, and would bring into more active operation the principle of natural selection, so that the evolution of still higher genera and species would be a natural result. Exactly at what point man appeared in Tertiary or Quaternary times could not be affirmed, but his existence in Tertiary times was practically a necessary supposition. Now the oldest undisputed evidence of man's existence in Europe belongs to the interglacial periods—probably the first—but there is a growing body of evidence indicating his existence in Pliocene times. Man of the glacial period (Quaternary) is known to us for the most part only by the implements he left behind him and the animal remains with which these are almost constantly associated. From these we learn that with his hammer stones he was able to fashion by chipping crude knives, spear and arrow heads, celts and scrapers. These he made mostly from flint or the hardest stone available. With weapons of this class, probably in parties, he hunted and slew the mammoth, cave bear, woolly rhinoceros, reindeer, elephant, lion, and hippopotamus, together with many others. The animals named, however, all flourished with man of the paleolithic period in England, France, and Central Europe generally. They furnished him in the first instance with food, and from their skins, by means of bone needles, and hide thongs, he fashioned rude coverings. He knew nothing of herding cattle nor of agriculture, and his most comfortable dwelling was a cave. In dealing with stone implements, however, it was found that the great majority of them had to be assigned to a very different class from those already alluded to. Contrasted with these it may be said of this second group that the skill displayed in their manufacture was of a much higher order; their variety and character showed that they were adapted to a much more advanced stage of culture, whilst the situations in which they were found and the remains with which they were associated showed that they belonged to a much later period. Accordingly the term "Neolithic" had been applied to them. The speaker, after treating of the culture of what is commonly understood as the Neolithic period, dealt briefly with the introduction of bronze and iron. (Applause.)

The Vice-President, in thanking the lecturer for his paper, pointed out that great quantities of mammoth bones had recently been found in caves in the South of Ireland, and also remains of the Arctic lemming, and said he had little doubt that similar remains will be found in our County Antrim caves when they are examined. A long and instructive conversation and criticism ensued, in which Mrs. Hobson and Messrs. Gray, Bell, and Donaldson took part. The lecturer briefly replied, and the proceedings terminated.

A paper on the "Origin of the Carnmoney Chalcedony" was read before the Geological Section on Wednesday, January 10th, by Mr. J. Strachan, of Ballyclare. The Chairman of the Section (Mr. G. C. Gough, A.R.C.Sc., B.Sc.) presided, and there was a good attendance.

(This paper is printed as an appendix.)

The Chairman welcomed the paper, as one involving much original work on the part of the author, and was inclined to believe that the theory put forward that evening was the right one, although he was not prepared to agree with all the ideas of the author. Messrs. May, Fennell, M.R.I.A.; Welch, M.R.I.A.; Gray, M.R.I.A.; Tomlinson, all expressed their appreciation of the paper. Mr. Fennell proposed, and Mr. Gray seconded, that this meeting send a recommendation forward to the Committee of the Field Club that the paper should be printed *in extenso* in the proceedings. This was strongly supported by the Chairman and others, and carried unanimously, and the proceedings closed, after the author had replied to criticisms.

The third ordinary meeting of the Winter Session was held on January 16th, in the Museum, the President (Mr. W. H. Phillips) being in the chair. Two papers were read, one by

Madame Rodolphe Christen on "A Summary of Club's Recent Glacial Work," and the other by Mr. W. J. Knowles, M.R.I.A., on "Stone Axe Factories near Cushendall."

There was a large attendance, especially of the older members, who were pleased to see Madame Christen and Mr. Knowles once more among them.

(Madame Christen's paper is printed *in extenso* as an appendix.)

Mr. Knowles then commenced his paper on Stone Axe Factories, and said—Papers on this subject have already been read in Belfast. First to the British Association in 1902, and again to the Royal Society of Antiquaries of Ireland in July last. The only reason for bringing it a third time before a Belfast audience is, that the full harvest of finds has been practically gathered in and catalogued, and a pretty complete summary can now be given. Fully three times the number of objects have been collected that were known when the first paper was given. Tievebulliagh was the chief centre of the industry. There it was fully revealed to view owing to the covering of peat having been removed by denudation. Smaller manufacturing spots were found all over Glenballyemon and some neighbouring valleys. Although other tools and implements besides axes were made, yet the latter are by far the most numerous, and it is evident that the main object in all the sites whether large or small was the manufacture of axes.

Over 2,500 axes from these sites are in possession of the author. Of these 2,262 are in the rough or chipped state, and 240 have been ground so as to smooth them and sharpen their edges. A few have undergone a further step, by being more or less polished. The majority are whole specimens, but I have enumerated in the above total 273 which, though broken in the course of making, would have been good examples. The number of ground axes is small, compared with that which is chipped only; but many of the ground and polished axes were, no doubt, distributed to different other districts by trading. One of the chipped specimens is 14¾ inches long, 4¾ inches broad, and weighs 8¾ lbs. It is the most massive axe I believe

in the British Islands. A second axe is 14 inches long, 4¾ inches broad, and weighs 7 lbs. This specimen, and one slightly smaller, were found together in the townland of Knockans, sticking in the ground, with their edge downwards, and as the finder remarked, "just as they had dropped from the sky," thus illustrating by his remark the popular belief that stone axes are thunderbolts. The axes are of all degrees of finish and of all sizes from those mentioned down to less than an ounce in weight. Of other kinds of objects there are stones with pointed ends, called picks; some with side edges that may be called choppers or skinners, some oval implements, and some almost circular. Longish flakes were dressed into points, and scrapers were made from flakes with both broad and narrow scraping edges. The flakes, which are very numerous, are, as a rule, short and broad. They were all evidently the waste material occurring in the making of the axes, yet many of them show signs of use in both cutting and scraping, and some of them had been specially prepared for such purposes by secondary working along the edges. A few long flakes were found, one being 8½ inches, rather unusually long for an Irish flake. About 200 hammer-stones were found, the majority of them made out of waste pieces of rock, but more or less rounded by constant hammering; others were of waterworn pebbles of quartzite. The full total of objects collected by the author exceeds 4,000. The axes which have undergone grinding must have been ground on the old red sandstone which appears in the lower part of the valley, possibly where it is exposed in beds of streams, but no special portion of rock showing grooves, such as one would expect to see where grinding had taken place, has yet been observed. The rock, of which the larger number of implements has been formed, would appear to be a metamorphic rock foreign to the district. It occurs in the form of natural boulders covered with striæ. It is of bluish black colour, very fine and close in the grain, and has a conchoidal fracture quite equal to flint. Professor Cole, to whom I submitted specimens, takes the rock to be "an altered, fine-grained diorite, which has been penetrated late in its history

by a vast number of chalcedonic vesicles." There are some axes of quartzite and one of rock crystal. Some are made of a coarse-grained rock, which did not chip freely, and axes of such rocks would appear to have been brought into shape by repeated hammering of the surface so as to reduce projecting portions to powder. The whole find is of great importance, and throws much light on the pre-historic industry of making stone axes.

Quite lately the finds of stone axes and other implements became scarce, while collectors had largely increased, and were outbidding each other for specimens. Then some persons in the district took to making modern imitations so as to meet the demand. A few collectors were taken in at first, as it was easy to be taken in when one was unsuspecting, and the specimens were well covered with clay; but the fraud was soon found out, and the whole trade in axe collecting suddenly collapsed. But there are still many spurious specimens weathering in the valley, and many of them are in the possession of pedlars and ragmen, who were themselves taken in. Unwary collectors of some future date would, therefore, require to be watchful, as it is for such persons that the spurious specimens are being held in reserve.

Discussion then took place on these papers, and among those who spoke, testifying to the value of the papers, were Messrs. Gray, M.R.I.A.; Welch, M.R.I.A.; Wright, F.G.S.; Cunningham, Bell, May, Knowles, M.R.I.A.; Gough, B.Sc.

Madame Christen and Mr. Knowles having replied to the criticisms, and two new members having been elected, the proceedings closed.

"A CHAT ABOUT BRITISH STAR FISHES."

The members of the Society held the fourth Wednesday meeting on January 24th at their rooms in the Museum, College Square, the Vice-President (Mr. Robert Patterson, M.R.I.A.) being in the chair.

Mr. Galway read a paper entitled a "Chat about British Star Fishes," and in introducing his subject said that the Echinodermata constituted one of the great classes of animals, and are characterised by a radial symmetry rather than bilateral symmetry. The comparative anatomy, embryology, and palaeontology point to these animals as having derived their radiate form, ambulacra, and the coil of the gut through having passed through a "pelmatozoic" stage in which the mouth faced upwards, the animal being attached by part of its body-wall. Star-fish are covered with a coriaceous skin, which is strengthened by a beautiful net work of calcareous plates, and are highly organised. The water vascular system of the radiate type is characteristic of the group, and is quite unique in the animal kingdom. The water circulating through a system of sacs and tubes is carried by five radial canals through the body, which enable the tubular sucking feet to act as organs of progression and respiration. On dissection a tube foot is found to divide at its base into two branches, one passing into a closed sac, and the other into a large tube which runs from the tip of the ray, receiving in its course similar branches from all the other tube-feet in each ray; this large tube again opens into a circular tube surrounding the mouth, and which leads through the Madreporic canal, a curved calcareous column running obliquely up to the surface, and terminating in the Madreporite, a wart-like body found on the surface of the true star-fishes. The water vascular system was explained by means of a diagram showing the different tubes with their sucking feet attached. Exceedingly minute and beautifully formed pincer-shaped organs found on star-fishes and sea-urchins are the pedicellariae. These are merely modified and elaborated spines. No class of invertebrate animals appear to have been better represented during past epochs than the Echinoderms, and in the case of the Crinoids immense masses of rock are formed from their remains, in Derbyshire large beds of marble being mainly composed of the broken stems and heads of the crinoids or stone-lilies. A short sketch was given of the structure and principal characteristics

of the Crinoidea, Ophiuroidea, and Asteroidea, with specimens of each order, while living specimens were shown, and proved of much interest to the members.

A general discussion arose at the completion of the paper, and was taken part in by various members.

LECTURE ON "DENEHOLES AND SOUTERRAINS."

On Wednesday evening, February 7th, at the Museum, Mrs. Hobson read a very interesting paper under the above title, the Vice-President (Mr. Robert Patterson) being in the chair.

The lecturer divided her subject into two distinct parts, dealing with the ancient Deneholes first, and after mentioning the probable derivation of the word from Anglo-Saxon, "denne" a cave, said that the highest authority had stated that it was "dane" hole, and in the name lurked a tradition that these structures had been hiding places from the Danes. The construction of a dene-hole was a deep circular shaft sunk vertically for 60 or 80 feet, and about 3 feet diameter, with foot-holes cut in the sides of the shaft for ascent and descent, and at the foot branching out into a cluster of usually six chambers, with, in some cases, a height of eighteen to twenty feet. Three groups of Deneholes were dealt with, one at Hangman's Wood, Grays, Essex, of 56 shafts, 15 of which had been explored, and two groups at Bexley, Kent, 600 yards distance between the one at Stankey Wood, consisting of 60 shafts, very close together, and the other at Cavey Spring.

The various "finds" were touched upon, bones of various animals, man, flint implements, Samian ware, ancient British pottery, Roman pottery, &c.

A great difference of opinion exists as to the uses of these ancient structures, and three different theories are current. The granary theory (that they were storehouses for grain, as was certainly the case in many continental deneholes), the chalk-

pit theory (the chalk removed as a top-dressing for land, as in many modern instances), and the refuge theory. The latter seems the most satisfactory solution regarding the groups of *ancient* deneholes. As to age, they are post-neolithic, some cases merely pre-Roman, and others (judging from the "finds") Roman.

The lecturer then drew attention to the mining for flints carried on at Brandon from immemorial times to the present day. A large number of slides were thrown on the screen, those illustrating the work at Brandon being sent by Mr. F. Hembry, of London. Among the pictures was one of a lady, suspended over the mouth of a denehole, about to be lowered by the aid of a windlass.

The second part of the paper was "Souterrains in Antrim and Down," visited by the lecturer since her last paper before the Club two years ago, and consisted of structures at Timinary, Shank Bridge, Fort Hill, and Crebilly, all in the neighbourhood of Ballymena. Also at Ballyhill, Ballymartin, Glendun, Cullybackey, Knockdhu, Scawt Hill, all in Co. Antrim. In Co. Down one at Slanes, Nr. Cloughey, Slieve-no-Boley, Backaderry Cross Roads, and Henan's Fort, also a series of photos. taken of a souterrain at Lucan by Mrs. Shackleton, with the lecturer in the entrance. Some of these "coves," as they are called in the country, are as long as 120 feet, and have chambers varying in number up to seven or eight. The structures, though similar in many cases, show great diversity, no two being alike.

In addition to views of many of the openings, Mrs. Hobson had pictures of several cromleacs, menhirs, cistvaens, quite near to the souterrains mentioned, and plans by her daughter, Miss F. F. Hobson, from measurements taken on the spot; also a model of one at Shankbridge, giving an excellent idea of the mode of construction, being built up of tiny stones, and roofed over with long, narrow slabs, all of unhewn stone.

The lecturer said she could not close without saying how great was the kindness and hospitality bestowed upon her by

those on whose lands these various objects of interest were (Applause.)

Mr. Patterson, after the lecture, voiced the feelings of the audience in saying how interesting the lecture had been. Mr. Deane, Mr. Alex. Milligan, Miss Andrews, Mr. Gough, F.G.S., and Mr. W. H. Milligan all spoke of the value and interest of the paper.

Mrs. Hobson having replied, the proceedings closed.

"AGE OF THE EARTH."

A meeting of the Geological Section was held in the Museum, College Square, on Wednesday, February 14th, when the Chairman of the Section (Mr. G. C. Gough, B.Sc., F.G.S.) gave a talk on the "Age of the Earth," the President of the Club (Mr. W. H. Phillips) being in the chair.

After a rapid review of the nebular hypothesis of the formation of the earth, Mr. Gough explained how Lord Kelvin, from the rate of cooling of the earth at the present time, calculated many years ago that the earth's age must lie between twenty and four hundred millions of years. Later from more accurate data, he reduced these limits to somewhere between twenty and forty millions. All his calculations, however, fall to the ground since the discovery of radium, as there appears to be enough present in the earth's crust to supply all the heat given off by radiation.

After a reference to the tidal retardation caused by the attraction of the moon, mention was made of Professor Joly's calculation of eighty to ninety million years from the amount of salt present in the ocean at the present time. Turning to the ways in which geologists can calculate the age of the earth, it was pointed out that we had approximately fifty miles of stratified rocks, each layer of which had been built up grain by grain. This process was a very slow one, and the least period of time that would satisfy most geologists was a hundred million years, others thinking it required even longer. Then

there was the point of view of the biologist who, believing in a slow evolution of life from the lowest to the highest, required a long period of time for this purpose. Professor Sollas would be satisfied with a period of only twenty-six million years, but very few biologists agree with him, the majority thinking that a period three or four times longer is nearer the mark. In conclusion, Mr. Gough said that in round numbers a hundred million years would probably satisfy both Geologists and Physicists, and might be looked upon as the approximate age of the earth.

After the address, a long discussion took place, those taking part being Messrs. Cunningham, Gray, Tomlinson, Carson, and Anderson. Mr. Gough having replied, the proceedings closed.

"WOOD: ITS NATURAL HISTORY AND IDENTIFICATION."

The fourth meeting of the Club was held in the Museum, College Square, on February 20th, when Mr. A. Deane (Curator of Municipal Museum) gave a lecture on "Wood: Its Natural History and Identification." The President (Mr. W. H. Phillips) was in the chair. The lecture was illustrated by specimens and lantern slides.

The lecturer commenced by calling attention to the great contrast between the tiny oak seedling and the huge oak trunk with its large cylinder of wood; that the necessary substances to form wood were obtained from the air and soil, and for this purpose there must be a root, stem, and leaves. A timber tree, although differing considerably in outward appearance to that of a daisy, belonged to the flowering plants, in so much that it produced true seeds from flowers. Woody plants were divided according to the manner in which development of wood takes place. Only those trees that increase in bulk by forming rings could produce the durable substance which formed timber.

The object of the root was to anchor the plant, and to take from the soil water containing salts in solution, but they also assisted in dissolving fragments of stone which they corroded

by excreting an acid substance. As the root descended into the soil, so the stem rose into the air, giving off branches bearing a number of leaves.

The cross-cut end of an oak log was described, showing the pith, heartwood, sapwood, and the delicate sheath called the cambium, situated outside the outermost ring of sapwood, followed by a jacket of bark, the innermost layers being known as bast. Piercing the wood and bast were a number of radiating lines, called medullary rays. Among these parts the cambium sheath is the most important, and covers the root, trunk, branches, and twigs like a huge glove. Its importance lies in the fact that without it there would be no new wood or bast. Turning to one of the rings in the oak-log, reference was made to the large porous tissue formed in the spring, followed later in the season by a dense woody mass, called the summer wood. It was for this reason that rings were so clearly marked on the ends of many logs, and as it is usual for one to be formed annually, they are called annual rings. Woods with large pores produced an open grain, while closely-deposited wood produced a close grain, but the user of timber required wood and not cavities, and the fewer cavities there are, the better the wood when used as timber. It is a closely-packed, thick-walled tissue that is needed.

Reference was made to the heartwood as a dead tissue formed from the living sapwood, and that as the sapwood changed into heartwood it becomes impregnated with all kinds of antiseptic substances, to the nature of which heartwood owes its durability. In the willow the heartwood does not change its colour, and the protective substances were absent. This accounted for so many hollow willow trunks to be seen on a country walk, and which proved that heartwood is not necessary for the life of a tree, as can be witnessed during the summer, when hollow willow trunks will be found bearing a crop of leaves, and shewing every sign of a healthy life, because the sapwood of trees performs the function of conducting the crude sap up the trunk to the leaves. Some woods never possess heartwood, but in such as have it the more heartwood

the better the wood, when used as timber, for its absence, or the presence of only a little, is a sign that the wood was cut from a young tree.

The oak wood was then compared with that of the pine wood, and it was pointed out that there were a great number of woods like the pine, and differing from the oak, in not having true pores (vessels), but elements known to botanists as tracheides. Timber trees are sometimes roughly classified into broad-leaved trees and narrow-leaved trees, or conifers, an example of the former is the oak, and the latter Scotch pine. The medullary rays were not only important to the life of a tree in linking together the living elements of the wood and bast, but when the wood is used as timber a good deal of its figure depended upon whether the wood was cut parallel with the medullary rays. The bast is formed from the cambium, but not to the same extent as wood, still it is also an important part of a tree, for in it the food travels to its destination, and it is protected by a corky coat, the bark.

The importance of the leaves can be best understood from the fact that if anything destroys or suppresses their function, a poor production in the annual growth of wood results. They are the laboratories manufacturing food, and giving off unnecessary water brought up from the soil.

At this stage a number of interesting slides, dealing with this part of the paper, were described, and the lecturer then passed on to the second division of his subject—the Identification of Wood—in which he said there was a wide field for research, as the subject was only in its infancy, and the more the subject is studied the more practically important the matter becomes. He was not prepared to under-rate the rule-of-thumb method of knowing a piece of timber through constantly handling it. A carpenter had no need for a text-book to tell a piece of oak wood, any more than a child required a book on botany, to tell a daisy, but the time may come when the user of timber meets with a piece of wood he has never seen before. Here then something more is needed, and Science, with its precise definitions, steps in where common-sense stops short.

By noting certain characters we are able to identify many kinds of wood. A number of accessory characters were explained, such as the pith of oak being 5-angled, whereas in the walnut it was chambered, causing a defect in the centre plank of each log, while the characters concerning the wood itself could be divided into physical and anatomical, the physical characters being more or less bound up together. The hardness varies in wood with the compactness of the grain. Some woods feel cold like marble, others feel warm. Further evidence is obtained by the aroma or taste as in the pencil cedar. The burning of wood often afforded a clue, a familiar example being the Chinese joss sticks made from the sawdust of sandal wood. For the anatomical characters all that is required is a smooth surface to the wood and a pocket lens for examining it, and in nine cases out of ten it will show all that is needed to identify a wood. The chief point to notice is the presence or absence of true pores in the annual rings, and if absent then the wood is coniferous, but if pores are present, it is one of the broad-leaved trees of which a considerable difference is to be found in the mode of grouping. The different methods of grouping of the other tissue elements were mentioned, and a number of beautiful sections of woods were thrown on the screen, and the parts pointed out.

In conclusion the lecturer laid stress upon the fact that anyone taking up the classification of wood as a study will have the satisfaction of finding himself practically on untrodden ground. A scientific key was wanted, but until more investigation was accomplished such a key could not be attempted in a satisfactory way.

Messrs. Gray, M.R.I.A.; Welch, M.R.I.A., and Orr having spoken, the lecturer replied, and the proceedings closed.

"SIMPLE MOUNTS FOR COMMON OBJECTS."

The usual Wednesday meeting was held on February 28th, in the Clubroom, College Square, when Mr. H. L. Orr read a paper on "Simple Mounts for Common Objects." Mr. W. H.

Gallway temporarily took the chair until the arrival of the Vice-President (Mr. R. Patterson, M.R.I.A.)

Mr. Orr, in introducing his subject, said:—"The subject of my paper should appeal to many of those present who, like myself, are collectors of various natural history objects, and who may be troubled by the problem of how to satisfactorily preserve and display them. Most of us have experienced the loss of good specimens by having them insufficiently protected from atmospheric influences, insects, and other causes. Those of you who have collections of butterflies and moths or of birds' eggs mounted—as they too often are—in drawers or boxes without adequate protection know the anxiety which visitors not versed in nature lore can inspire you with when they insist on drawing attention to the beauties of your best specimens with pointed finger. If my paper shall in any way assist such collectors by showing them a simple way out of a difficulty my object in preparing it will be fulfilled."

By "common objects" he, as a field naturalist speaking to field naturalists, meant such objects as land, fresh water, and marine shells; butterflies and moths; beetles; birds' eggs and nests, &c. A good mount for such objects should, besides affording the necessary protection, be dust proof and damp-proof, and should admit of the object being properly examined. By many naturalists mounts are deemed expensive luxuries, and not at all essential; but he held that if a specimen is worth having at all it is worth the expenditure of the little time and labour necessary in order to make a suitable mount for it. The lecturer then went on to show how this object can be attained simply, cheaply, and artistically. He passed round for inspection mounts with beetles, butterflies, birds' eggs and nests, and gave a practical demonstration of their construction.

The Vice-President, Mr. Gray, M.R.I.A., Mr. Gallway, Mr. Foster, Mr. May, and Mr. Robinson all spoke after the demonstration, testifying to the value of Mr. Orr's paper and to the neatness of his mounts.

Mr. G. Donaldson afterwards gave a demonstration of another method of mounting specimens.

"THE EVOLUTION OF THE MOURNE MOUNTAINS."

The usual weekly meeting of the Club was held on March 7th, in the Museum, College Square North. The President (Mr. W. H. Phillips) occupied the chair, and briefly called upon Mr. W. J. C. Tomlinson to read his paper on "The Evolution of the Mourne Mountains."

Mr. Tomlinson, in introducing his subject, referred to the rise and progress of the science of geology in the last century. During that period great changes came over the views held by scientific men regarding the physical history of the earth, and over their ideas regarding the origin and permanence of our present mountain forms. The traditional, but rather incorrect, views in vogue in earlier times came with the progress of investigation to be discarded. The study of field geology and the observation of the forces of nature led students of the new science to the conclusion that mountains, as a rule, are not the outcome of recurring catastrophes. The truth was brought home irresistibly to the patient observer that the slow, steady sculpturing carried on from age to age by nature's eroding and denuding agents was ample enough to produce all the outward features we witness in the present aspects of our hills and valleys. The British school of geologists has always been so deeply engrossed in studying the stratigraphical relationship and character of the various rock formations that the dynamical questions involved in all theories of mountain architecture have not received from them that full consideration which is their due. This reproach, however, is now beginning to disappear. On the other hand, American geologists, who in the pursuit of their studies were confronted by geological phenomena on a tremendous scale, both as regards magnitude and complexity, were forced to bestow upon dynamical geology that consideration which it merited. Their conclusions are pregnant with the most fertile ideas now extant regarding the history of mountain building. The study of the structural geology of mountain groups has led the foremost expositors of the science to adopt a three-fold classification for all existing terms. These are—

(1) mountains of accumulation, (2) mountains of elevation, and (3) mountains of circumdenudation. A consideration of the Mourne mountains itself, coupled with the evidence of dykes, has led geologists to declare that it is much younger in age than the granite of the Newry to Rathfriland and Castlewellan area, from which it is entirely separated by intervening Silurians. In composition and character it resembles strongly the volcanically-formed rhyolites of County Antrim, such as occur at Tardree Hill and Templepatrick. It is, therefore, believed to be of Eocene age, contemporaneous with the rhyolites of Antrim; and consequently coming in, as regards geological time, between the lower and upper basaltic outflows of the same county. A recent study of the subject has led Professor Cole to speculate thus—"Possibly the little dome of Ailsa Craig, which has suffered so severely from denudation that its pebbles lie scattered by hundreds all down the Irish Coast, was a bold mass of the same age as the Mournes and Arran, and became almost destroyed by the severities of glacial times. In any case we can now follow out the line along which granite intruded in Eocene times, from the south of Carlingford Lough to the smooth red hills of Skye." Having endeavoured to conjure up before the mind's eye the vast procession of changes which the Mournes have witnessed in the process of their evolution, we are inclined to fall back, for a descriptive summing up, upon the lines of Tennyson, himself an ardent geologist—

"There rolls the deep where grew the tree,
O earth, what changes hast thou seen;
There, where the long street roars, hath been
The stillness of the central sea.

"The hills are shadows, and they flow
From form to form, and nothing stands;
They melt like mist, the solid lands,
Like clouds they shape themselves and go."

(Applause.)

Mr. Tomlinson, after concluding his paper, explained, and passed round for examination, a splendid set of geological photographs of the Mourne district, taken by Mr. R. Welch; and also a typical series of igneous rocks. The paper was illustrated by excellent drawings of geological sections exposed in different parts of the mountains.

Messrs. W. H. Milligan, Wm. Gray, M.R.I.A.; J. Strachan, R. May, Rev. P. Quail, and Robert Patterson, M.R.I.A., having spoken to and criticised the paper, Mr. Tomlinson replied, and the proceedings terminated.

"A TALK ON COINS."

The usual Wednesday evening meeting was held on March 14th, in the Museum, College Square, when Mr. W. H. Robinson gave a talk on "Coins," a subject more or less new to the Club. The chair was taken by the Vice-President (Mr. Robert Patterson, M.R.I.A.), who called on the speaker to proceed with his paper. Mr. Robinson said—"Ancient money was of two kinds, coined and uncoined. By uncoined one may understand pieces not issued under authority, while by coined money those pieces in which the weight and fineness are certified by the integrity of the designs impressed upon the surfaces of the metal. Prior to the introduction of a regular coinage, rings of gold, silver, and brass formed the earliest currency in Ireland. These rings, as well as fibulæ of gold—at one time supposed to have been used merely as personal ornaments—not only passed as money in Ireland, but were graduated according to Troy weight in multiples of the half pennyweight or twelve grains. No Irish coins have been discovered which can be assigned to a period earlier that the arrival of the Danes in Ireland. The earliest coins struck in Ireland are of the second half of the tenth century, or beginning of the eleventh. They consist of pennies, and bear the name of Aethelred II. of Wessex, and were struck at Dublin. Previous to that time the

coins current in Ireland were Anglo-Saxon pennies, chiefly of Edward the Elder and his successor, imported by the Vikings." The speaker then treated of various coins in historical succession, showing specimens of many valuable coins to illustrate his paper. Some Isle of Man coins having been shown and described, Mr. Robinson brought his paper to a conclusion by giving some hints to those about to collect coins. He urged his audience only to get the best and most perfect specimens possible, and that they should be kept in a cabinet of either oak, mahogany, or walnut. Cedar wood should on no account be used, as it had been found to injure the surface of copper coins. Under each coin should be placed a ticket with a description of the coin, and a reference to a catalogue in which should be placed any information, such as the date on which the coin was acquired, &c. In cleaning coins a soft brush should be used with plain soap and cold or tepid water, and the coin dried in boxwood sawdust. On no account should a coin be polished, not even with the softest material, as valuable details on the coin may thus be obliterated.

The Vice-President, Messrs. R. May, Greenhill, and Blur having spoken to the paper, the proceedings terminated.

"SPIDERS."

The fifth meeting of the Winter Session was held on March 20th in the Museum, when the Secretary (Mr. Gough, A.R.C.Sc., B.Sc.), who has recently been appointed Professor of Natural History at the Royal Agricultural College, Cirencester, gave a lecture on "Spiders" to a large audience. The President (Mr. W. H. Phillips) occupied the chair, and briefly called on the lecturer to read his paper. Mr. Gough began by stating that spiders were not usually regarded with respect for many reasons, such as a bad reputation with regard to cruelty, and also because of their poisonous bite, &c. Yet they were not without their use, and were of help in destroying insects.

The fact that spiders were not insects was pointed out, and the chief characteristics of both were shown on the screen, together with a slide showing the different forms and variety of colour seen among spiders. In speaking of the anatomy special mention was made of the mandibles and the spinnerets. The mandibles contain a poison gland, the poison of which is fatal to insects, and often to small animals. The bite of the spider is seldom fatal to man, and then only when he is in a weak state of health when bitten. Even ordinary spiders sometimes bite man, and if bitten in a tender part of the body the bite may be felt like the prick of a needle, and very occasionally slight swelling results. The spinnerets may be from four to eight in number, and each may contain from 100 to 1,000 tubes. Liquid silk is forced through these tubes, and solidifies on exposure to the air, and the spider can unite as many threads as it likes to make its compound line. It is stated that it takes four million to make a line the thickness of a human hair. Many attempts have been made to use the silk commercially, but they have all failed, mainly owing to the cannibalistic propensities of the spiders. The making of the various kinds of snares was next dealt with, and illustrations of the different kinds shown. Afterwards the various spiders which do not make snares were discussed, such as mygale, the bird-catching spider, which is of a large size; the various trapdoor spiders, which make holes in the ground and close them with a spring door; running and jumping spiders, water spiders, &c. The courtship of spiders is very interesting, the female nearly always being the "better half." In an extreme case the proportion between male and female was the same as if a man of six foot and 150lb. weight married a woman of 75 or 80 feet and 200,000lb. weight. Courtship is usually, therefore, a risky thing for the male spider, and it is frequently cut short by the female catching and eating him. The eggs are laid in cocoons of silk, which are sometimes very pretty, both in shape and colour. Sometimes they are left, but usually the female spider takes care of the cocoon, often carrying it about with her, and resisting all attempts to relieve her of it. The

young are hatched as miniature adults, and do not go through a metamorphosis, as in the insecta. The habits of spiders, their use as weather prophets, their instinct and apparent reasoning powers, and their perils, and the way they protect themselves were all dealt with in the exceedingly able and interesting lecture. Mr. A. R. Hogg manipulated the magic-lantern, and the pictures thrown upon the screen made the lecture doubly interesting. The Chairman, Rev. C. H. Waddell, B.D.; Messrs. John Hamilton, and C. M. Cunningham, L.D.S., referred to the lecture, and asked a number of questions, all of which were answered by Mr. Gough. The election of a new member brought the proceedings to a close.

"THE AMERICAN CONSUL ON AMERICAN MOUND BUILDERS."

The usual Wednesday evening meeting of the Club was held in the Museum, College Square North, on March 28th, the chair being occupied by the President (Mr. W. H. Phillips).

The feature of the evening was a paper by Mr. Knabenshue, the American Consul in Belfast, the subject being "The American Mound Builders." The lecture was listened to with great attention and interest by a large audience, so large indeed that the use of the lecture hall had to be taken.

Mr. Knabenshue said that a century and a quarter ago, when the conclusion of the war with the mother land allowed the people of the United States to turn to the development of the country, a remarkable Westward emigration began. Crossing the mountain barrier of the Alleghanies, the hardy pioneers poured into the eastern portion of the Mississippi basin. The most valuable routes led into the valley of the Ohio River. The country was largely covered with heavy forests. Here the settlers found numerous works in the way of earthen ramparts, circles, and mounds, with here and there on some commanding hill site walls and structures of dry stone, evidently built for

defence. So, as the predominating structures were earthen mounds, they attributed them to the red occupants of the land, and called them "Indian mounds." Now comes the question, Who and what were the mound-builders? All the data we have are the structures and the skeletons and relics found in their graves. Perfect skulls are rare. Generally they are in fragments, but the comparatively few crania we have are fair average skulls. As Professor Huxley said regarding a quite different skull, that "It might have held the brain of an educated European or the thoughtless brain of a savage." They are not distinguishable of themselves from those of the American Indians, nor from the general run of Caucasian skulls. But it is clear they had no written language, for they have left nothing that can be construed into an inscription. Their tobacco pipes of soap-stone, greenstone, slate, &c., are often carved into the rude similitude of the beaver, otter, deer, and turtle, the owl, duck, heron, eagle, or other birds, but show no traces of inscription of any kind. Their pottery, found chiefly in the South, shows the simplest ornamentation, but nothing that can be construed into a record. They were in the neolithic stage, for the only metal found in their graves is native copper in plates or beads, and their copper was obtained from the mines at present worked on the south side of Lake Superior. They used it only for ornament. Their weapons and tools were of stone or bone. They made rude textiles, for some few remains of such have been found, apparently woven of long grasses. They were an agricultural people, as is shown by the fact that their works are found on or adjacent to areas which have rich alluvial soil. They could not be herdsmen, because the ox, the horse, the sheep, and the pig were not known to them, and were introduced into North America by Europeans. They cultivated maize, because its charred grains have been found in their kitchen-middens. Many theories have been advanced, but the latest drift of opinion among American archæologists is that they were of the same race, but more peaceful, than the Indians who occupied the land when it was settled from Europe, tribal in their civilisation, and exterminated or absorbed

by the more warlike branches of the race, coming from whence no one knows. (Applause.)

The paper was spoken to by the President, Miss Andrews, Mrs. Hobson; Messrs. Gray, Dickson, Green, May, Milligan, Fennell, and Donaldson, and, the lecturer having replied, the proceedings terminated.

"SOME RECENT RECORDS IN OUR LOCAL FLORA."

By W. J. C. Tomlinson. Read before the Botanical Section, 7th April, 1906.

The close of the 1905-6 Session of the Field Club has led our Sectional Secretary to spread his annual net in the hope of securing from the working members some noteworthy plant records or other botanical gleanings. It is at his request, therefore, that I have brought together a few of the notes I made during the course of last season. I am not certain that they are worth recording, but such as they are, I now bring them before you.

On the occasion of the Club Excursion to Dungannon, I obtained *Ranunculus trichophyllus* in an old carboniferous limestone quarry-hole at Killyharry, south-east of Donaghmore. *Vicia angustifolia* was met with the same day on a quarry spoil-bank near Carland. In both cases these were new localities, and second records for County Tyrone. A day or two afterwards I came across a good display of *Ranunculus trichophyllus* in a swamp on the marshy heath between Castlerock and Downhill Castle. Hitherto this crowfoot had only been met with in County Derry on a marsh at Magilligan. *Parnassia palustris* I found growing over a very restricted area on the moist grassy flat between the Portstewart sand hills and the River Bann, a new locality for Derry. A rarer and most interesting County Derry find was the Scale Fern, *Ceterach officinarum*, which occurs sparingly on a bridge over the Agivey river, west of Garvagh. Long unknown in the county, this plant was observed

for the first time a few years ago on a wall at Prehen, near Derry City. I had seen this fern at Garvagh the previous year. On the last occasion, however, I was accompanied by Mr. R. Lloyd Praeger and Mr. H. C. Marshall. We were on our way to Errigal Glen to search for the seemingly vanished *Pyrola secunda*. For this a most exhaustive scrutiny was made, but without avail, though the other two *Pyrolas*, *media* and *minor*, were seen at several places on the south bank between the mill and the bridge. As consolation prizes, however, Mr. Praeger obtained, in the Glen, the Beech Fern, *Polypodium phegopteris*, and I secured a fine specimen of the Moonwort, *Botrychium lunaria*, about half a mile above Errigal Bridge.

Passing to County Antrim, I may in the first place note the re-finding of the Gromwell, *Lithospermum officinale*, on the chalk escarpment at Whitehead, not seen there apparently since the publication of the Flora of Ulster. I also obtained the lesser Twayblade, *Listera cordata* on the wind-swept peaty summit of Agnew's Hill, recorded from the same locality by Templeton in 1804. Then, in the second place, a few new localities for some of our rarer plants may be recorded. *Ranunculus trichophyllus* I found in a mill pond near Templepatrick, and also in small streams and ditches in the boggy flat between Ballyrobin and Tully, parish of Killead. *Nymphaea alba* occurs in a pond near Dunadry railway station. The Moneywort, *Lysimachia nummularia* is well established on the railway embankment between Magheramorne and Glynn, close to Larne Lough. The same plant was observed in comparative abundance on the shore of Lough Neagh, south of Staffordstown Station, between Cranfield and Rabbit Point. At the latter locality I also noticed in their congenial habitat a good colony of both the Arrowhead, *Sagittaria sagittifolia*, and the Flowering Rush, *Butomus umbellatus*, a considerable and out-of-the-way extension in range for both plants. *Pyrola minor* was seen at Crow Glen, but very sparse, owing to the destruction caused by the feet of the cattle grazing on the wet boggy slope. The Toothwort, *Lathraea squamaria*, was seen in three local localities, two of them, however, Glenalina and Carr's Glen, I sub-

sequently learned were known to Mr. Stewart. The third is in the Graymount demesne, close to the Antrim Road, no record of which appears hitherto to have been made. The Adder's Tongue Fern, *Ophioglossum vulgatum*, I found in abundance in a field at Greenmount, Antrim.

My County Down notes contain scarcely any record of importance, save such as have already been noted by other workers. The Sea Purslane, *Atriplex portulacoides*, I found in considerable quantity on the shore half a mile south of Portaferry.

I wish, in conclusion, to record my thanks to Mr. S. A. Stewart for his ever-ready help in identifying specimens, and supplying valuable information.

The regular monthly meeting of the Club was held in the Museum, College Square North, on the 10th April, 1906, the chair being occupied by the Vice-President (Mr. Robert Patterson, M.R.I.A.).

Mr. Wm. Gray, M.R.I.A., read his "Report as Delegate to the British Association, with Suggestions as to how the Club may forward the Objects of the Association." In the course of his remarks, Mr. Gray stated that the conference was held in the rooms of the Linnean Society, Burlington House, and was opened by the reading of the report of the Corresponding Societies' Committee, which stated that the suggestion of Principal Griffith at the Cambridge Conference was approved by the Committee of the British Association; henceforth, therefore, there would be two classes of local societies eligible for relationship with the British Association. The societies, like the Belfast Naturalists' Field Club, now known as "Associated Societies," would in future be called "Affiliated Societies," and would consist, as at present, of such societies as undertake local scientific investigation and publish the results. Each affiliated society might be represented at the meetings of the British Association by a delegate, who must be a member of the Association, and who would be for the time being a member of

the General Committee. The new class of corresponding societies would be called "Associated Societies," and would include societies formed for the purpose of encouraging the study of science, and being not less than three years in existence. Such societies might each send to the Annual Conference a delegate, who must be a member or associate, and would have all the rights of a delegate from an affiliated society except that of membership of the General Committee. The Association published every year a catalogue of the most important papers referring to local scientific investigations issued by the associated societies. Of these four came from the Belfast Naturalists' Field Club in 1904, one by Miss Mary K. Andrews, and three by Mr. Joseph Wright. Of the number catalogued in 1905 two came from the Belfast Field Club, one from Mrs. Hobson, and one from Mr. Robert Bell. Arising out of the Chairman's address at the Conference there was an animated discussion upon the organisation of field clubs' excursions, the manner of conducting them, and the value or otherwise of the results. From every point of view Mr. Gray considered the excursion arrangements of the Belfast Naturalists' Field Club compared favourably with any field club in the kingdom for the attainment of their common object, the advancement of science.

Dr. Wm. Martin opened a discussion on "Treasure Trove." In consequence of the erroneous ideas that prevail with reference to what is called "treasure trove" many objects of intrinsic and historic value found their way to the melting-pot, or were otherwise made away with, to the disadvantage of the public. The members of the Conference, therefore, thought that it would be desirable that the law relative to the subject should be more generally made known, and full instructions furnished for the guidance of reputed owners and finders. The subject of copyright also came under consideration.

A most animated and interesting discussion was opened by a paper read by Professor Boulger, F.L.S., F.G.S., on the preservation of our native plants. The unanimous testimony of the assembled delegates was that the destruction and rapid dis-

appearance of many of our most favourite native plants was common throughout the kingdom. Belfast was no exception to the general rule. The process of that destruction, which a cultivated public sentiment could alone arrest, occurred daily in the city market, where wild plants, rooted from the boundary of an ever-widening devastated area, were exposed for sale under conditions best calculated to secure their final extinction. With reference to the recently-constituted "British Science Guild," Mr. Gray said the concentration of effort and the necessity for conducting all classes of human endeavour under scientific methods seems to be recognised as a necessary factor in modern progress. It had been the guiding principle of the British Association from its foundation. For a similar purpose another society was inaugurated on the 30th of October last, to be known as the "British Science Guild." The British Association aimed at furthering scientific methods; the new Guild aimed at the application of scientific results to the practical purposes of life, in which America, Germany, and Japan have been so successful.

Referring to the Club's work and other educational movements, Mr. Gray, believing with Huxley in the "value of natural science as a means of mental discipline," said he was glad to see a display of living botanical forms brought into the Municipal Museum, which encouraged a hope for the development of a really working municipal museum by the combination of the old and new. The display of taste and ability manifested in the fernery in the Botanic Gardens Park pointed to the possible restoration of its old educational character both from a scientific and economic point of view. The resources of the Ulster Fisheries and Biology Association offered an opportunity for the practical study of marine zoology. It was to be hoped that the location of the proposed aquarium will be such as would serve the purpose of earnest students of science, rather than contribute to the amusement of thoughtless seaside trippers. Mr. Gray, in conclusion, referred to what the members could do by loans and gifts of classified natural history objects to help teachers in our elementary schools, and also to the several

subjects of investigation carried on by the British Association, in the furtherance of which the Club's members might possibly render acceptable service. (Applause.)

The paper was spoken to by the Vice-President; Messrs. W. J. Fennell, M.R.I.A.; R. Welch, M.R.I.A.; George Donaldson, and W. J. C. Tomlinson, and Mr. Gray replied.

ANNUAL MEETING.

The Annual Meeting was held on April 25th, 1906, in the Museum under the presidency of Mr. W. H. Phillips.

A short notice of the occurrence of foraminifera in gravels was given by Mr. J. Wright, F.G.S., who said he had recently received from Mr. John Brown, F.R.S., a ball of rolled clay taken from a gravel pit at his residence, Longhurst, Dunmurry, which he thought might yield foraminifera. On examination he found that it contained a large number of foraminifera mixed with shell fragments, &c.

The paper was discussed by Messrs. G. C. Gough, Wm. Gray, G. Donaldson, S. A. Stewart, R. Welch, and R. Bell.

The Secretary, Mr. Gough, B.Sc., read the Annual Report.

The Treasurer's Report having been submitted by Mr. W. H. Phillips, the reports of the Librarian, and Botanical and Geological Sections were read by Messrs. J. L. Jackson and A. Milligan, and were then adopted on the motion of the President (Mr. Phillips), seconded by Mr. W. J. Fennell, M.R.I.A.

The election of officers and committee was then proceeded with. On the proposal of Mr. R. Patterson, seconded by Mr. W. H. Gallway, Mr. W. H. Phillips was elected President, both speakers referring to the valuable services which he had rendered the Society in the past.

Treasurer, Mr. W. H. Phillips, proposed by Mr. R. Welch, seconded by Mr. Hobson.

Librarian, Mr. J. L. S. Jackson, proposed by Mrs. Hobson, seconded by Mr. Hamilton.

The other office-bearers appointed were as follows:—Vice-President, Mr. N. H. Foster, proposed by Mr. H. L. Orr, and seconded by Mr. T. Anderson.

Secretaries, Mr. W. H. Gallway and Mr. W. J. C. Tomlinson, proposed by Mr. R. Patterson, seconded by Mr. N. H. Foster.

A vote of thanks to the retiring Secretaries was passed, on the proposal of Mr. Fennell, seconded by Mr. Gray, to which the Secretaries suitably replied.

The following were then elected members of the new Committee:—Messrs. R. Bell, N. Carrothers, G. Donaldson, W. J. Fennell, W. A. Green, H. C. Marshall, H. L. Orr, R. Patterson, R. Welch, and Professor Gregg Wilson.

Suggestions having been made as to the places to be visited in the coming year, and Mr. Christian elected a member, the proceedings closed.



RULES

OF THE

BELFAST NATURALISTS FIELD CLUB.

1906-07.

I.

That the Society be called "THE BELFAST NATURALISTS' FIELD CLUB."

II.

That the object of this Society be the practical study of Natural Science and Archæology in Ireland.

III.

That the Club shall consist of Ordinary, Corresponding, and Honorary Members. The Ordinary Members to pay annually a subscription of Five Shillings, and that candidates for such Membership shall first pay an entrance fee of 5/-, and be proposed and seconded at any meeting of the Club, by Members present, and elected by a majority of votes of the Members present.

IV.

That the Honorary and Corresponding Members shall consist of persons of eminence in Natural Science, or who shall have done some special service to the Club; and whose usual residence is not less than twenty miles from Belfast. That such Members may be nominated by any Member of the Club, and on being approved by the Committee, may be elected at any subsequent Meeting of the Club by a majority of the votes of the Members present. That Corresponding Members be expected to communicate a Paper once within every two years.

V.

That the Officers of the Club be annually elected and consist of a President, Vice-President, Treasurer, Librarian, and two Secretaries, and ten Members who form a Committee, and shall hold not less than eight Meetings in the year. Five Members to form a quorum. No Member of Committee to be eligible for re-election who has not attended at least one-fourth of the Committee Meetings during his year of office. That the office of President, or that of Vice-President, shall not be held by the same person for more than two years in succession.

VI.

The Committee may from year to year appoint a Sectional Committee as may be considered desirable to further original investigations in any one or more departments of the Club's work. Each Sectional Committee to be composed of six Members of the Club, not less than two being Members of the Club's Committee. No financial responsibility to be incurred by the Sub-Committee or any Officer of the Club without the previous approval of the Club's Committee. Any Sectional Committee may elect its own Chairman and Secretary from its Members.

VII.

That the Members of the Club shall hold at least Six Field Meetings during the year, in the most interesting localities, for investigating the Natural History and Archæology of Ireland. That the place of meeting be fixed by the Committee, and that five days' notice of each Excursion be communicated to Members by the Secretaries.

VIII.

That Meetings be held Fortnightly or Monthly, at the discretion of the Committee, for the purpose of reading papers; such papers, as far as possible, to be original and to treat of the Natural History and Archæology of the district. These Meetings to be held during the months from November to April inclusive.

IX.

That the Committee shall, if they find it advisable, offer for competition Prizes for the best collections of scientific objects of the district; and the Committee may order the purchase of maps, or other scientific apparatus, and may carry on geological and

archæological searches or excavations, if deemed advisable, provided that the entire amount expended under this rule does not exceed the sum of £10 in any one year.

X.

That the Annual Meeting be held during the month of April, when the Report of the Committee for the past year, and the Treasurer's Financial Statement shall be presented, the Committee and Officers elected, Bye-laws made and altered, and any proposed alteration in the general laws, of which a fortnight's notice shall have been given, in writing, to the Secretary or Secretaries, considered and decided upon. The Secretaries to give the Members due notice of each intended alteration.

XI.

Members of other Irish Field Clubs, residing temporarily or permanently in or near Belfast, may be enrolled Members of the Club without election or entrance fee on production of a voucher of membership of another Club, and without subscription for the current year, on production of a receipt showing that such subscription has been paid to another Club. Failing the production of such receipt, the usual subscription for the current year to be paid to the Treasurer on enrolment. The names of Members so admitted to the Club to be published with the notice of meeting following the date of their enrolment.

XII.

That, on the written requisition of twenty-five Members, delivered to the Secretaries, an Extraordinary General Meeting may be called, to consider and decide upon the subject mentioned in such written requisition.

XIII.

That the Committee may be empowered to exchange publications and reports, and to extend the privilege of attending the Meetings and Excursions of the Belfast Naturalists' Field Club to Members of kindred societies, on similar privileges being accorded to its Members by such other societies.

RULES FOR THE CONDUCTING OF EXCURSIONS.

I. The excursion to be open to all Members, each one to have the privilege of introducing two friends.

II. A Chairman to be elected as at ordinary meetings.

III. One of the Secretaries to act as Conductor, or, in the absence of both, a member to be elected for that purpose.

IV. No change to be made in the programme, or extra expense incurred, except by the consent of the majority of the Members present.

V. No fees, gratuities, or other expenses to be paid except through the Conductor.

VI. Every Member or Visitor to have the accommodation assigned by the Conductor. Where accommodation is limited, consideration will be given to priority of application.

VII. Accommodation cannot be promised unless tickets are obtained before the time mentioned in the special circular.

VIII. Those who attend an excursion without previous notice will be liable to extra charge, if extra cost be incurred thereby.

IX. No intoxicating liquors to be provided at the expense of the Club.

Exchanges of Proceedings.

Aberdeen Working-men's Natural History and Scientific Society.
Transactions, No. 1.

Barrow Naturalists' Field Club.
Annual Report and Proceedings, Vol. XVI.

Bath Natural History and Antiquarian Field Club.
Proceedings, Vol. X., Part 4.

Belfast—Natural History and Philosophical Society.
Report of Proceedings, 1904 and 1905.

„ Ulster Journal of Archæology.
Vol. XI., Part 1, 2, 3, 4. Vol. XII., Part 1.

Berlin—Helio Abhandlungen und Mitteilungen, 1905.

Berwickshire Naturalists' Club.
Proceedings, Vol. XVIII., Part 2. Vol. XIX., Part 1.

Brighton and Hove Natural History and Philosophical Society.
Annual Report and Abstracts of Papers, 1905.

Bristol Naturalists' Society.
Proceedings, Vol. I., Part 1.

Bulletin, Society Linneinne, Nos. 323 to 342.

Cardiff Naturalists' Society.
Report of Transactions, Vol. XXXVII., 1904-5.

Dublin—Royal Irish Academy.
Transactions, Vol. XXV., Section B., Parts 3, 4; Section C., Part 5; XXVI., Section B., Part 1.
Proceedings, Vol. XXV., Section C., Parts 10 and 11; Section B., Part 6.

„ Royal Society of Antiquaries of Ireland.
Journal, Vol. XXXV., Parts 1, 2, 3.

Edinburgh—Botanical Society.
Transactions and Proceedings, Vol. XXII., Parts 1 and 2.

„ Geological Society.
Transactions, Vol. VIII., Part 3.

Frankfort—Bericht der Senckinbergischen Naturforschenden.
Gesellschaft, 1905.

Glasgow Natural History Society.
Report and Proceedings, 1901 and 1902.
,, Philosophical Society.
Proceedings, Vol. XXXII.
Hamilton Association.
Journal and Proceedings, 1903 and 1904.
Hertfordshire Natural History and Field Club.
Transactions, Vol. XII., Parts 3, 4, 5, 6.
Hull Scientific and Field Naturalists' Club.
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NATURAL
TORY

The following Publications of the Club can be had from the Librarian.

Seventh Annual Report—1869-70, containing Appendix I., List of the Irish Liassic Fossils—Tate, 1 Plate 2/6
Eighth Annual Report—1870-71, containing Appendix II., List of Irish Liassic Foraminifera—Wright; and List of the Fossils of the Estuarine Clays of Antrim and Down—Stewart ... 2/6
Ninth Annual Report—1871-72 1/-
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Proceedings—Series II., Vol. I., Part I., 1873-4, containing Appendix III., List of Mosses of North-East of Ireland—Stewart; and List of Cretaceous Microzoa of North of Ireland—Wright, 2 Plates 2/6
,, Series II., Vol. I., Part II., 1874-75 1/-
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,, Series II., Vol. I., Parts V. and VI., 1877-78 and '78-'79 (in one) 1/-
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,, Series II., Vol. II., Part I., 1880-81, containing Appendix VI., List of Foraminifera of South Donegal—Wright; Sponge Remains from Carb. Limestone, County Sligo—Wright, and Fossil Sponge-spicules, County Sligo—Carter, 1 Plate ... 1/6
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,, Series II., Vol. II., Part V., 1884-85, containing Appendix IX., Ostracoda of Belfast Lough—Malcomson; Fungi of North of Ireland—Lett; Foraminifera of "Protector" Cruise, &c.—Wright; Cretaceous Foraminifera of Keady Hill—Wright; Irish Coleoptera—Patterson 3/-
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28 AUG. 1907

Annual Report and Proceedings.



SERIES II. PART VI.

VOLUME V. 1906-07.

BRITISH MUSEUM
NATURAL HISTORY

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BRITISH MUSEUM
NATURAL HISTORY



PHOTO.

Young Grey Seals, Lambay Island.

C. BARING.

1, 2, 3—Young Seal, 30 inches long, October, 1906. 4, 5—Young Seal, 42 inches long, November, 1906.

ANNUAL REPORT AND PROCEEDINGS

OF THE

BELFAST NATURALISTS' FIELD CLUB.

FOR THE YEAR ENDING 31st MARCH, 1907.

(FORTY-FOURTH YEAR.)

SERIES II.
VOLUME V.



PART VI.
1906-07.

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1907.



BELFAST NATURALISTS' FIELD CLUB.

FORTY-FOURTH YEAR, 1906-1907.

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Vice-President:

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Hon. Secretaries:

W. H. GALLWAY, BELGRAVIA, BANGOR, CO. DOWN.
W. J. C. TOMLINSON, 17, GLANDORE GARDENS, BELFAST.

BRITISH MUSEUM
NATURAL HISTORY

Annual Report.

Your Committee have pleasure in submitting their report for the forty-fourth year, and in doing so beg to congratulate the members on the increased prosperity and popularity of the Club.

The membership on the 1st April last year was 395; on the corresponding date this year it stands at 418. There were 38 new members elected, of whom 34 qualified by paying their fees, and 4 did not so qualify. There were three deaths, and 8 resignations, leaving a nett increase of 23 members.

During the year 8 Committee meetings have been held, the average attendance being 12 out of a possible 15.

The Programme of the Summer Session was carried out, and consisted of eight Excursions, viz.:—

Leitrim Station for Castlewellan ...	19th May.
Tandragee (Half-day)	2nd June.
Ardboe	16th June.
Shane's Castle (Half-day)	30th June.
Donegal (Long Excursion)	12th to 14th July.
St. John's Point, Killough (Half-day) ...	28th July.
Greencastle and Cranfield Point	11th August.
Ballycarry (Half-day)	25th August.

The attendance at the Excursions was very satisfactory, the average number present being sixty-three, and at the Tandragee Excursion we had ninety-five.

The Committee desire to place on record the indebtedness of the Club to Lord and Lady Annesley, the Duke of Manchester and his Agent, W. H. Atkinson, Esq.; Lord O'Neill, and W. J. Porritt, Esq., for permission, kindly given, to visit their grounds; and to P. M. Gallagher, Esq., who kindly acted as guide to Donegal Castle and Abbey, during the Donegal Excursion, and more especially to Sir Arthur and Lady Wallace, Major and Mrs. Hamilton and their son, Captain Hamilton, and John A. Hanna, Esq., J.P., of Belfast, and Mrs. Hanna, for

hospitality accorded to the members during the Excursion to Donegal, their kindness being very highly appreciated. Our thanks are also due to our esteemed friends, W. J. Fennell, Esq., M.R.I.A., and Mrs. Fennell, for supplying a sumptuous tea to the Geological Section on the occasion of their visit to Dunmurry on 26th May last.

The Winter Session was opened as usual with a Conversazione, which was held this year in the Large Hall of the Y.M.C.A., Wellington Place, on October 25th, and which was very well supported by members and friends.

Besides the ordinary monthly meetings, the informal fortnightly meetings, held on Wednesday evenings, were continued, the attendance at these meetings not being so good as your Committee have a right to expect, and we appeal to members for better support in this direction.

A complete list of meetings held this Session is as follows:

1906.

Tuesday, November 20th—Presidential Address, "A Talk about some Beautiful Varieties of Ferns," W. H. Phillips.

Wednesday, November 28th—"Lantern Display," By Members.

Wednesday, December 12th—"Leaves and their Functions," Arthur Deane.

Tuesday, December 18th—"The Stone Age in South Africa," Rev. W. A. Adams, B.A.

1907.

Wednesday, January 9th—"The Geogony of some Secondary Minerals," J. Strachan.

Tuesday, January 15th—"Clouds and their Evolution," T. E. Farrington.

Wednesday, January 23rd—"Geological Aspects of Water Supply," Andrew Duncan, B.Sc.

Wednesday, February 13th—"Bees: Their Structure and Habits," Hamilton M'Cleery.

Tuesday, February 19th—"Results of an Investigation of the Drift of the Irish Sea," Chas. M. Cunningham; and "Who were the Fairies?" E. J. M'Kean, B.A., B.L.

Wednesday, February 27th—"Mounting Microscopic Objects," William Gray, M.R.I.A.

Wednesday, March 13th—"Nuptial Change in Puffin's Bill," Robert Patterson, M.R.I.A.

Tuesday, March 19th—"Lambay Island," R. Lloyd Praeger, M.R.I.A., Robert Patterson, M.R.I.A., and Robert Welch, M.R.I.A.

Wednesday, March 27th—"Fruits and Vegetables," Arthur Deane.
Tuesday, April 9th—"Continental Glaciation," Professor Grenville, A. J. Cole, F.G.S., M.R.I.A.
Wednesday, April 17th—Annual Meeting.

Your Committee regret that, owing to pressure of business, the delegates appointed to attend the meeting of the Irish Field Club Union Committee, in Dublin, on November 1st, were unable to do so, and, through the same cause, the delegate was unable to attend the meeting of the British Association held in York.

Messrs. W. J. Fennell, M.R.I.A., and Will Rankin were elected as members of the Council of the Ulster Fisheries and Biology Association.

The Treasurer will submit his statement of accounts, which shows a deficit of £3 9s 1d, as against £11 10s 5d last year, all accounts having been paid up to the present. The Librarian's report, the reports of the Botanical and Geological Sections, and that of the Sub-Committee appointed to adjudicate on collections submitted for Club Prizes, will be presented.

And, finally, your Committee desire to place on record their obligations to the Superintendents of the several Railway Companies for facilities afforded on the different Excursions; to the Press, for publishing reports of the Club's meetings; and to the Public Bodies and Kindred Societies who have favoured us with their publications during the past year.

(Signed) W. H. Gallway, } *Hon.*
W. J. C. Tomlinson, } *Secs.*

Librarian's Report:—

We beg to acknowledge the receipt of proceedings from the various Kindred Societies of Great Britain, America, and the Continent, which have been placed in our bookcases for the benefit of Members. We have also forwarded copies of our proceedings to all Societies with which we have correspondence. There have been a few applications from others for our Proceedings, and, as far as possible, we have complied with their requests.

It is gratifying to see that there is a greater demand for books than in the preceeding year, which shows that our Members are taking a keen interest in the work of other Societies.

We regret that we have again to ask Members to enter all books they take out in a book which is provided for the purpose. As there are a few books out with Members, and not entered in the lending book, we would like them returned as early as convenient, to enable us to keep our library in order.

(Signed)

J. L. S. Jackson, *Hon. Librarian.*

Report of Committee of Geological Section:—

The Committee of the Geological Section beg to submit the following report of the year's work, and are pleased to see that the interest formerly taken in this department has been well maintained with satisfactory results. We are also pleased to note the addition of several new members to the section.

During the year the following excursions were successfully carried out:—Annadale and Messrs. Martin's Brickyards, Longhurst, Carnmoney, Kilwaughter, and Tardree. The attendance at the excursions, and the discussions arising out of the geological features at the various localities, showed an amount of enthusiasm which was beneficial to all, and which tends to make the working of the Section a success.

Mr. J. Strachan delivered a very able paper at one of the Wednesday evening meetings on "The Geogony of Some Secondary Minerals," which was greatly appreciated by a large audience.

Glacial Geology:—In reference to the section having taken up this subject, the following reports on erratics were made: At Messrs. Martin's Brickyards 95.3 per cent. erratics were found, including:—Eurite (with Riebeckite), Dolerite, Granite, Schist, Augen Schist, Chert, Sandstone (Ballycastle), Quartz, Conglomerate, Rhyolite, Carboniferous limestone, Lias (with included fossiis), Magnesian limestone, Cretaceous rocks (with

fossils of *Belemnitella mucronata*), Silurian shales and Basalts. From Carthall Brickyards, Coleraine (per Miss M. K. Andrews) —Chalk, Flint, Basalt, Slate, Porphyry, altered fine grained Basalt.

Mr. J. Wright having kindly consented to examine any clays, sands, &c., submitted to him for Foraminifera makes his report as follows:—Annadale Brickfields—*Miliolina subrotunda* (Montg.) very rare, *Textularia globulosa* (Ehr.) rare, *Bulimina pupoides* (D'Orb) very rare, *B. Elegantissima* (D'Orb.) very rare, *Bolivina punctata* (D'Orb.) rare, *B. dilatata* (Rss.) very rare, *B. plicata* (D'Orb.) very rare, *Globigerina bulloides* (D'Orb.) frequent, *Orbulina universa* (D'Orb.) very rare, *Discorbina sp.* very rare, *Truncatulina lobatula* (W. & J.) very rare, *Nonionina depressula* (W. & J.) common, *Polystomella striato-punctata* (F. & M.) very rare. From Longhurst—*Bolivina punctata* (D'Orb.), *B. plicata* (D'Orb.), *Cassidulina crassa* (D'Orb), *Lagena lucida* (Will.), *Globigerina bulloides* (D'Orb.), *Orbulina universa* (D'Orb.), *Discorbina obtusa* (D'Orb.), *D. globularis* (D'Orb.), *D. minutissima* (Chaster), *Nonionina aepressula* (W. & J.), *Polystomella striato-punctata* (F. & M.). From Carthall, Coleraine—*Cassidulina crassa* (D'Orb.), *Nodosaria scalaris* (Batsch), *Marginulina costata* (Batsch), *Frondicularia millettii* (Br.), *Globigerina bulloides* (D'Orb.), *Nonionina depressula* (W. & J.).

We desire to express our thanks to Mr. J. Wright for his kindness in working out the above lists.

We tender our thanks to Mr. J. Brown, F.R.S., for his kindness in conducting our excursion over his gravel-pit and grounds.

Also to Mr. Robt. Bell for fine specimens of Natiolite, and to Mr. J. H. Bland for geological specimens to be added to the late Gen. Smythe's collection.

The Committee cordially invite all Members of the Club, interested in Geological work, to join the Section, and by their presence and help, make our meetings successful and instructive.

(Signed)

J. L. S. Jackson, *Hon. Secretary of Section.*

Report of Committee of Botanical Section:—

The Committee of the Botanical Section are pleased to report that since the last Annual Meeting the interest taken in this department of the Club's work has been well maintained during the year.

The summer of 1906 being exceptionally favourable for outdoor work, a good many localities were visited, and a fair amount of work done. All the places selected for the general Excursions of the Club were of special interest to the Section, each locality having a rich and varied flora peculiar to itself. These Excursions were well attended by members of the Section, and splendid work was done.

Of the out-door work brought under our notice, we select the following as being the most interesting:—A very strange and curious Raspberry *(Rubus Idæus)* was found in a field above Ligoniel by Miss S. Blackwood. Of this specimen Professor J. W. H. Trail, F.R.S., the greatest authority in Britain at present on Galls, says, "It is not altered by mite or any other animal; its cause, however, is unknown to me. The parts of the flowers are virescent, or like aborted leaves. The specimen is the most marked example I have seen."

The Director of Royal Gardens, Kew, having received plants for cultivation sent by Miss S. Blackwood, also reports:—"We shall hope to see a fresh crop of these curious flowers here next season, and to work out their development."

Another very interesting find by the same lady member was Wild Balm *(Melittis mellisophyllum)* on the shore of a small lake in County Cavan. This plant is not considered native in Ireland, nor indeed has it ever been recorded even as a casual.

Mr. W. H. Robinson found new localities for *Geranium striatum, G. Phœum* and *Orobanche minor.*

Mr. W. J. C. Tomlinson recorded new stations for *Leucojum æstivum, Orchis pyramidalis, Mercurialis perennis, Cardamine amara, Botrychium Lunaria, Lathræa Squamaria.*

Mr. H. L. Orr found new localities for *Geranium pratense, Lithospermum officinale, Ophioglossum vulgatum.*

The following interesting casuals have been found in the immediate vicinity of Belfast by members of the Section:—*Bupleurum rotundifolium, Galium tricorne, Sisymbrium Sophia, Erysimum cheiranthoides, Erysimum perfoliatum, Camelina sativa, Lepidium sativum, Lactuca virosa.*

It was suggested early in the Session that several visits should be made to the ground acquired for the New Cemetery at Dundonald, and a complete list made of all the plants, both rare and common. It was also expected to yield some good results, as plenty of fresh ground had been turned up during the improvements. As a result of those visits, a list of 125 species in all was made out, including the following rare plants:—*Orobanche minor, Carduus setosus, Malva moschata, Barbarea intermedia, Lamium amplexicaule, Artemisia Absinthium.* As this list is more or less incomplete, it is intended to be revised and completed this summer.

During the Winter Session the following meetings were held:—November 17th, Lecture by Rev. C. H. Waddell, B.D., Subject—"Collecting and Preserving Plants"; January 19th, Paper by Mr. W. J. C. Tomlinson on "The Homes of our Rarer Wild Flowers: a Study in Plant Geography"; February 16th, Lecture by Rev. C. H. Waddell, B.D., "How to Know our Common Mosses"; April 13th, "Notes by Members of the Section on Plants Collected and recorded during the Session". All these meetings were well attended, and a keen interest taken in the subjects.

A considerable number of mounted plants have been added to our Herbarium, the contributors being Rev. C. H. Waddell, B.D.; R. L. Praeger, M.R.I.A.; Madame Christen; and Mr. R. Hanna.

As there are a good many plants still wanting to complete the list of our Local Flora, the Committee hope the Members of the Club will assist in collecting specimens of these plants during the Summer Session, so that our Herbarium may contain a complete list of all our local native plants.

(Signed)

N. Carrothers, *Hon. Sec. of the Section.*

Report of Sub-Committee on Prize Competitions:—

We regret to report that no collections have been sent in for competition this year for the many prizes offered by the Club. Two essays have been sent in in competition for Prize No. 16, offered by Mr. W. J. Fennell, M.R.I.A., for the best paper on the Occurrence and Distribution of Iron Ores and similar mineral products from Counties Antrim and Down.

We find both papers are so excellent and capable that it is impossible to place one before the other. We, therefore, have pleasure in recommending that the Committee add a prize of a similar amount (say two guineas), and that both papers be awarded prizes.

We also feel that these papers should, if possible, be printed, as they are of too high value to be altogether lost to the Club.

(Signed)

S. A. Stewart.
Robert Patterson.
Robert Welch.

Dr. Treasurer's Account for the Year ending 31st March, 1907. Cr.

To Subscriptions received	..	..	..	£94	15	0	By Balance from last Account	£11	10	5
,, Entrance Fees	..	..	..	8	15	0	,, Type Writing	0	4	6
,, Receipts for Conversazione	..	..		18	11	0	,, Advertising	1	5	5
,, Balance of Excursions	..	..	..	1	18	9	,, Half-tone Blocks	2	2	0
,, Publications Sold ..	..	..	..	0	6	5	,, Printing and Stationery	3	19	11
,, Balance due to Treasurer ..	..	..		3	9	1	,, Printing Reports, 1905-6	30	14	3
							,, Expenses of Conversazione	18	13	9
							,, Rent of Museum	18	0	0
							,, Commission to Collector	3	8	0
							,, Donation to *Irish Naturalist*	2	0	0
							,, Do. Irish Field Club Union ..	2	2	0
							,, Expenses of Lectures	3	18	0
							,, Postages	28	13	0
							,, Gas	0	14	0
							,, Insurance	0	10	0
				£127	15	3		£127	15	3

W. H. PHILLIPS, *Honorary Treasurer.*

Proceedings.

SUMMER SESSION.

LEITRIM AND CASTLEWELLAN.

The first excursion of the Forty-fourth Summer Session took place on May 19th, the place selected being the district newly opened up between Leitrim and Castlewellan by the Great Northern Railway Co. Sixty-seven members and friends travelled down by the 10 a.m. Newcastle Express, and alighting at Leitrim Station, paid a visit to Magheramayo Fort, a large circular mound, of which the greater part of the enclosing rampart still remains intact, and is surrounded by a deep fosse. A souterrain exists here, though the entrance to it is now partially filled up. After leaving the fort, the party walked to M'Cartan's granite quarries at Ballymagreshan, and from here another rather long walk brought the party to Castlewellan shortly before three o'clock. An adjournment was made to the Castle grounds and gardens, kindly thrown open to the Club by Lord Annesley, where the remainder of the afternoon was spent. The party met for tea at the Annesley Arms at six o'clock, after which a short business meeting was held, under the chairmanship of the President, Mr. W. H. Phillips. A hearty vote of thanks was passed to Lord Annesley, on the motion of the President, seconded by the Vice-President, Mr. Nevin H. Foster. And four new members—Richard Bailie, Wm. Shaw, W. J. Wakeman, and J. W. Storey—being elected, terminated the formal business of the day. The 8 o'clock train from Castlewellan brought the party back to Belfast at 9-15.

The Entomologists and Conchologists reported few captures. The Botanists discovered the Mountain Fern (*Lastrea Oreopteris*),

which is not common, at Tullynasoo Mountain, near the quarries; and *Viola lutea* was obtained at the upper part of the lake shore in Castlewellan demesne. The district was poor in bird life, the Meadow-Pipit being the dominant species. A few Wheatears, Stonechats, Whitethroats, Yellow Buntings, and other common species were observed. The movements of a pair of Pied Wagtails in the vicinity of one of the lunching groups near the quarries pointed to the proximity of their nest; this was found in a crevice in a heap of granite chips. It contained one egg, and was profusely lined with feathers. In the Annesley demesne the notes of the Song-Thrush, Blackbird, Chiffchaff, Willow-Wren, Siskin, and Chaffinch were heard on every side. Apart from captive birds, thirty-five species in all were observed during the day. In the short time spent at the railway station prior to leaving Castlewellan, many Woodcocks were observed taking their customary evening flight, and, judging by the number seen, it was evident that here, as elsewhere in Ireland of late years, this bird is on the increase, and is breeding in tolerable profusion.

TANDRAGEE.

(HALF-DAY EXCURSION.)

The second excursion was held on June 2nd to Tandragee. Ninety-five members and friends met the conductors on the platform, and travelled down by the 2-15 train, reaching Tandragee in about an hour. The Club party, on reaching the bridge over the River Cusher, separated into two sections. The one entered the lower demesne at the bridge, and the other proceeded direct to the town. The latter were there met by the Rector, the Rev. Wm. M'Endoo, B.D., who very kindly acted as guide to the Church and Castle Demesne. The contingent which entered the Lower Demesne found it a veritable paradise for the collectors, who made the most of the time at their disposal. The party were delighted to meet here with the Rev. W. F. Johnson, M.A., F.E.S., of Poyntzpass, one of the

most accomplished and devoted naturalists in the Club. Mr. Johnson was accompanied by his wife, who now joined the party for the afternoon. On reaching the town and entering the upper Demesne, the separated contingents met in the neighbourhood of the Castle, and proceeded to enjoy themselves until tea-time. Tea was provided at the Manchester Hall at 6-30, after which the usual business meeting was held, the President (Mr. W. H. Phillips) occupying the chair. A cordial vote of thanks was passed to the Duke of Manchester and his agent, Mr. W. H. Atkinson, and also to the Rev. Wm. M'Endoo, to which the latter suitably replied. Four new members were then formally elected—James Cowie, James Baxter, Hugo Nesbitt, and Miss Hastings—and as it was now getting on for half-past seven o'clock, the party made for the station, and reached Belfast at 9-15.

The Lower Demesne at Tandragee has already been noted for some good species of beetles, notably *Bembidium tibiale*, recorded by Rev. W. F. Johnson; also *B. littorale* and *B. mannerheimi*. One water beetle was taken—*Haliplus ruficollis* —and several specimens of the handsome beetle, *Gastroidea viridula*. Among the captures were *Byturus tomentosus*, *Exomias brunnipes*, *Cœliodes quadrimaculatus*, *Phyllobius calcaratus*, *P. argentatus*, *Liophlœus nubilus*, *Athous hæmorrhoidalis*, and *Tachyporus obtusus*, var. *nitidicollis*, and *Omalium rivulare*. The Mollusca were plentiful, in all some twenty species (five of which were slugs) were obtained, the rarest being *Helix lamellata*, *H. fusca*, and *Vertigo edentula*. The pretty hedgehog slug, *Arion minimus*, and the tree slug, *Limax marginatus*, were also taken. Thirty-five species of birds were observed, the Kingfisher and Dipper being the most interesting, both of which are said to be fairly common in the district.

The Botanists noted a large number of very interesting plants, such as *Sanicula europæa*, *Asperula odorata*, *Œnanthe crocata*, which were common; the less common species being, *Ranunculus bulbosus*, *Chelidonium majus*, *Lychnis diurna*, *Sisymbrium Alliaria*, *Galium Mollugo*, *Veronica montana*,

Lathræa squamaria, *Mercurialis perennis*, *Epipactis latifolia*, *Allium ursinum*, and *Carex pendula*. An unrecorded colony of the Dog's Mercury (*Mercurialis perennis*) was pointed out by Mr. Tomlinson, growing by the roadside, near the railway station; also some fine specimens of Scale Fern (*Ceterach officinarum*) on a wall, near the town, no record of which appears hitherto to have been made. *Sisymbrium Alliaria*, found in the Upper Demesne, seems to be also a fresh record for this locality.

ARDBOE.

The third excursion of the Summer Session took place on June 16th, when eighty-five members and visitors met at York Road Terminus, and took the 9-15 a.m. train to Antrim, the programme being a steamer trip on Lough Neagh and visits to Ardboe and Toome. On arrival at Antrim, the party were joined by the Vice-President, Mr. Nevin H. Foster, M.B.O.U., and the Revs. W. S. Smith and W. A. Adams, and a few other friends. The party were soon on their way to the lake-side at the mouth of the Sixmilewater, and embarking on the ss. *Lough Neagh Queen*, steamed away shortly after half-past ten o'clock to Newport Trench on the Tyrone shore, which was reached shortly after noon. Here all disembarked for a walk along the shore to Ardboe Point, on which stands the ancient Monastic and Ecclesiastical ruins of Ardboe, with its justly celebrated Irish Cross. This Cross is one of the finest in Ireland, as well as being one of the least known. It stands eighteen feet high, and is composed of freestone, which is not found in the district. The date of the Cross may be assigned to the ninth or tenth centuries. It is now conserved as one of the National Monuments. Close beside the Cross are the ruins of the Pre-Reformation Church, which became the place of worship when the older one was abandoned. The Monastery of Ardboe is said to have been founded by St. Colman. It was destroyed by fire in 1166. A remnant of masonry, sufficient to outline the extent of the ancient Church, is all that now remains of the early Monastic

establishment. The party were treated to a very able and interesting lecture by Mr. Wm. J. Fennell, M.R.I.A., on the Cross and its associated Churches, and before leaving Mr. Wm. Gray, M.R.I.A., and the Rev. W. S. Smith spoke briefly on the geological and legendary aspects of this great fresh-water lake and district. Returning to the steamer, a start was made for Toome Bridge, which was reached about 3-15. Here a very interesting two hours were spent examining the Diatomaceous deposit which is converted into the Kieselghur of commerce at Messrs. Grant's works. Large tracts of land on both sides of the Bann are covered to a depth of several feet with an extensive deposit of this earth, which when dug out and dried, like turf, becomes white and flowery. That curious building known as the Temple of Liberty, built and presented to the town by Mr. John Carey, came in for a good share of attention, although now fast falling into decay. Tea-time having arrived, all adjourned to the O'Neill Arms Hotel. After tea, a short business meeting was held, when six new members were elected—P. J. Dunlop, James Glover, F. J. Hopkirk, Rev. W. A. Adams, F. W. Johnston, and R. W. Hancock. The President, Mr. W. H. Phillips, congratulated the members on the great success of the day's proceedings, and extended a hearty welcome to Professor Elliott Smith, who occupies the chair of anatomy in the Government College, Cairo, who had accompanied Professor Symington, F.R.S., of Queen's College.

The party embarked once more at 5-15, and reached Antrim in good time to catch the 7-52 train, and were back in Belfast at 8-35.

That rare and singularly erratic plant the Henbane (*Hyoscyamus niger*) was found in full flower, close to Ardboe Cross. Specimens of *Symphytum officinalis*, with whitish or cream-coloured flowers, were seen growing on a ditch a little inland. Of the other rare plants observed at Ardboe the following may be noted:—*Myrrhis odorata*, *Lychnis diurna*, *Saponaria officinalis*, *Tanacetum vulgare*, *Senecio sylvaticus*, *Conium maculatum*, *Sherardia arvensis*, *Valerianella olitoria*, and

Habenaria chlorantha; and between Ardboe and Newport Trench, *Orchis incarnata*, *Lysimachia Nummularia*, *Veronica scutellata*, and *Ranunculus heterophyllus*. The two orchids were again found at Toome, together with *Scirpus sylvaticus* and *Nasturtium palustre*. At Toome the best find was the Pepperwort (*Lepidium campestre*), which was found on a dry ditch bank by the roadside, near the bridge, and situated in Co. Derry, for which county it appears to be a first record.

The Ornithologists reported having seen forty-one species of birds on and about the Lough, the most interesting being the Yellow Wagtail *(Motacilla raii)*. This district is the only known breeding-place of the species in Ulster. The actions of a pair of Oyster-Catchers near Newport Trench suggested the near presence of their young, but a hurried look failed to discover them, which was disappointing, as this bird has not yet been recorded as breeding in Co. Tyrone.

SHANE'S CASTLE.
(HALF-DAY EXCURSION).

The fourth excursion of the Summer Session took place on June 30th, the place selected being Shane's Castle, on the shores of Lough Neagh. The large party of eighty-three travelled by the 12-25 train from York Road Terminus, bound for Randalstown, passing Sluggan Bog on the way, where was first discovered by Mr. Robert Bell, some few years ago, that mineral substance called Dopplerite.

On arrival at Shane's Castle Demesne, the party was photographed, the beautiful gate-entrance making a splendid background, by Mr. A. R. Hogg, the well-known photographer. The party made their way through the park to the Deer Park Bridge, thence to Dunmore Bridge, and crossing the latter, the walk was continued almost to Main-water-foot, where a beautiful vista of Lough Neagh was presented to view, and turning to the left past the Rockery the Castle was soon reached. Assembling on the terrace, the members listened with pleasure to a clear and

concise account of the O'Neill family, and a history of the Castle, from the lips of the Rev. W. S. Smith. Having explored the old Castle and the interesting graveyard adjoining, the party left the park at 6 o'clock, and walked into Antrim, where tea was served in the Protestant Hall at 6-30. After tea, a brief business meeting was held, under the presidency of Mr. W. H. Phillips, who warmly congratulated the members on the great success of the excursion. All met at the railway station at 7-50, in time to catch the train for Belfast, which was reached at 8-40.

The Entomologists had made some good captures, including a moth, whose identity was uncertain. The Botanists noted the following plants:—*Thalictrum flavum, Ranunculus penicillatus, Sisymbrium Alliaria, Viola canina, Lychnis diurna, Arenaria trinervia, Sedum Telephium, Galium boreale, Valerianella olitoria, Eupatorium cannabinum, Lycopus europæus, Scutellaria galericulata, Lamium album, Lysimachia vulgaris, L. Nummularia, Neottia Nidus-avis, Epipactis latifolia, Briza media,* and *Sisyrinchium angustifolium.* The last is, however, a doubtful native, although it has been recorded from Galway, Cork, and Kerry. *Ranunculus sceleratus* was found growing profusely near Antrim Station.

The Ornithologists observed forty-eight species of birds during the day. The Chaffinch was the dominant bird of the Demesne, and the Golden-crested Wren was also very common. A single Kingfisher was seen on the river. The Dipper was also seen, besides a Grey Wagtail, and a pair of common Sandpipers. A large family of Long-tailed Tits and a Tree-Creeper were busily engaged in searching the same tree for insect food. Nine adult Great Crested Grebes were seen together, and many Tufted Ducks, evidently breeding, resented the invasion of their ground. Mallards were common, while a male Red-breasted Merganser (*Mergus serrator*), accompanied by two females, gave rise to interesting speculation as to where they might be breeding. Black-headed Gulls were numerous, and two other species of Gulls were seen, while Common Terns were fairly abundant. Sandpipers (*Totanus hypoleucus*) fluttered about the shingle, and

a beautiful nest with four eggs was found. A single Cormorant (*Phalacrocorax carbo*) was seen, and innumerable Coots.

A spirited competition for the special prize offered by the President, for the best collection of flowering plants, resulted in a win for Miss Steele, with ninety-nine different species, all in flower.

DONEGAL.

(LONG EXCURSION).

The usual long, or three-day, excursion took place this year to the town of Donegal and surrounding district. The party left Belfast on Thursday morning, the 12th July, by the 7-30 train, and arrived back again on Saturday evening, the 14th July, by the train due at 8-15. Several members joined at intermediate points, making a total of 48 present. The Erin Temperance Hotel, Donegal, was made the headquarters during the trip. After a pleasant run, changing at Strabane Station for the narrow-gauge, the ride down Barnesmore Pass, with a glimpse of Lough Eske and the Eske Valley, and the beauty of the scenery, was thoroughly enjoyed. Donegal was reached shortly after mid-day. Here the party were welcomed by Mr. Robert Patterson, M.R.I.A., who kindly went the day before to make the final arrangements for the comfort of the party. An excellent luncheon was in readiness, to which full justice was done, after which wagonettes and cars were mounted for a drive round Lough Eske, with visits to Ashdoon Waterfall and Ardnamona Demesne. The Botanists paid a visit to Ashdon Waterfall to secure specimens of that rare fern *Asplenium viride*, and the Royal Fern *Osmunda regalis*. On reaching Ardnamona, the members were welcomed by Sir Arthur and Lady Wallace, and kindly entertained to tea. The gardens and woods were explored and the ferns and orchids, for which the district is famous, were noted, including:—*Hymenophyllum tunbridgense*, *H. unilaterale*, *Cystopteris fragilis*, *Lastrea spinulosa*, *L. æmula*,

L. Oreopteris, and *Polypodium Phegopteris*. *Lobelia Dortmanna* and *Nymphæa alba* were found growing abundantly in the lake.

Before leaving, Mr. W. J. Fennell, M.R.I.A., moved, and Professor Symington, M.D., F.R.S., seconded, a cordial vote of thanks to Sir Arthur and Lady Wallace for their kindness and hospitality.

Leaving Ardnamona about seven o'clock, the party drove direct to Donegal Abbey, where a short time was spent examining the remains of this famous Franciscan Monastery. Mr. W. J. Fennell, M.R.I.A., kindly pointed out the main features, and in a concise address enlightened the members as to its history. On the way back to the Hotel specimens were secured of *Vicia sylvatica* and *Scrophularia aquatica*. Dinner was served at 8-30, which finished the day.

On Friday morning a short visit was paid to Donegal Castle, situated on the north side of the town, after which the cars were mounted at 9-15 for the drive to Brownhall, the residence of Major James Hamilton, D.L., passing, on the way, Magherabeg Abbey, and halting outside the village of Laghy, to inspect the Carboniferous limestone quarries. Brownhall was reached at 11 o'clock, and the party were welcomed by Major and Mrs. Hamilton and their son, Captain Hamilton. Under the guidance of the two gentlemen, the members were enabled to explore the wonderful ravines, caves, &c., including the famous Pullans, and at the Sheepskin Cave Major Hamilton thoughtfully provided artificial light from magnesium wire, which enabled the party to see the wonderful stalactitic formations. Luncheon was partaken of here, after which all met again at Brownhall House, and a formal vote of thanks was moved by Mr. W. H. Patterson, M.R.I.A., seconded by Dr. A. M. D'Evelyn, and conveyed to our hosts by Mr. Nevin H. Foster, M.B.O.U., Vice-President, for their kindness. The drive was continued to Coolmore on Donegal Bay, which was reached at 3 o'clock, where the party scattered, each intent on his or her particular hobby. Some fine specimens of scrapers and celts were picked up by Dr. D'Evelyn and Mr. W. H.

Patterson, the latter being fortunate in unearthing a disc stone-scraper which was much admired. Among the rock-pools the beautiful Purple Sea Urchin (*Strongylocentrotus lividus*), also the rare *Trochus lineatus* were seen, and a number of Carboniferous limestone fossils were obtained from the rocks south of Coolmore Strand. *Carduus pratensis* and *Habenaria conopsea* were abundant, and on the return journey to Donegal, *Ceterach officinarum* and *Cystopteris fragilis* were noted growing on walls between Coxtown and Laghy.

Leaving Coolmore at 6 o'clock, Donegal was reached about 8 o'clock, and all sat down to dinner at 8-30, after which a short business meeting was held, the Vice-President, Mr. Nevin H. Foster, M.B.O.U., in the chair. Three new members were elected—Dr. Robert E. Hadden, Robert Cotter, and Miss M'Kinney, and a vote of thanks accorded to the Secretaries. Afterwards a resolution relative to the preservation of the Abbey and Castle of Donegal was moved by Mr. W. J. Fennell, seconded by Dr. D'Evelyn, and adopted without dissent.

Saturday morning having arrived, and the packing-up having been concluded, and an early breakfast over at 7-40, the cars were mounted for a drive to Mountcharles, where the Drumkeelan sandstone quarries and works were examined. Securing some specimens of *Osmunda regalis*, the drive was continued past Lough Glencoagh and St. Peter's Holy Well to The Hall, where the party were entertained to a sumptuous luncheon by Mr. John A. Hanna, J.P., and Mrs. Hanna, of Belfast. At 12-30 all assembled around the steps of The Hall, when a vote of thanks was cordially conveyed to the host and hostess; and bidding adieu, the return drive to Donegal was commenced, the town being reached in time to catch the 1-25 train for Strabane, where a welcome tea was provided in the Abercorn Arms Hotel. Having an hour and a half to spare before leaving by the 5-37 p.m. train for Belfast, the members roamed about in small parties, some exploring Lifford, till the hour of departure arrived.

Two members reported collecting, during the excursions, 43 species of land and fresh water Mollusca. Very few beetles

were observed, and only four butterflies and nine moths taken. Five species of Hymenoptera were collected, including the Giant Sawfly (*Sirex gigas*). Sixty-four species of birds were observed during the three days. Sir Arthur Wallace showed a stuffed specimen of the Golden Eagle, shot on his estate in 1849, the last one permitted to be killed here. These birds are seen on his mountains every year, but have not bred there of late. He also showed a pure white Swallow, obtained on the estate. Black-headed Gulls, Terns, Red-breasted Mergansers, and Herons were said to breed regularly on Lough Eske. The most remarkable fact learnt, however, was that the common House-Sparrow *(Passer domesticus)* is unknown at Ardnamona and Brownhall. Badgers are numerous and increasing in Ardnamona Demesne, and the stoat was reported as being too numerous.

ST. JOHN'S POINT, KILLOUGH.

(HALF-DAY EXCURSION).

The sixth excursion was on July 28th, and the place selected St. John's Point and the area about Killough Bay. The morning was so unpromising that only nineteen members met the conductors and travelled by the 12 o'clock express, reaching Killough about one o'clock. The rain-clouds cleared away, and the rest of the afternoon was bright and sunny. The road lay through the town past the church, and turning to the right, was continued westward to Rossglass, on the shore of Dundrum Bay. After a short rest here, the party proceeded to St. John's Point, some by the rugged boulder-covered shore, while others went by the inland road past Janeville, all meeting again in the vicinity of the Lighthouse. The ruins of the old Church of St. John and an associated well and wishing stone between Janeville and the Lighthouse were visited. The party again divided here, some going by the shore, but the main party kept to the road back to Killough, and so round to Ardglass, where all met at 6-45 for tea in the Castle Hotel. The usual business meeting was held, the Vice-President, Mr. Nevin H.

Foster, M.B.O.U., in the chair. The area around Killough is particularly rich in rare plants, of which the following were obtained:—*Glaucium flavum*, *Raphanus maritimus*, *Crithmum maritimum*, *Artemisia maritima*, *Mertensia maritima*, *Atriplex portulacoides*, *Sagina nodosa*, *Ononis repens*, *Apium graveolens*, *Eupatorium cannabinum*, *Cakile maritima*, *Euphorbia Paralias*, *Torilis nodosa*, *Trifolium striatum*, and *T. filiforme*, *Papaver Rhœas*, *Beta maritima*, *Juncus obtusiflorus*, *Cochlearia danica*, *Senebiera didyma*, and *Polygonum Raii*. Between the Lighthouse and Corbet Head the white-flowered variety of *Erythræa Centaureum* grew profusely; and on waste ground near the Lighthouse *Borago officinalis* and *Saponaria officinalis* occurred.

The Ornithologists noted thirty-five species of birds, among which very few land birds were noticed.

The Geologists of the party examined the igneous dykes, glaciated slates, raised beach, and consolidated sands and gravels that stretch round the coast here.

GREENCASTLE AND CRANFIELD POINT.

The Club had another of their interesting field meetings on August 11th, this being the seventh for the present session. The destination of the party was Greencastle and Cranfield Point, on the shores of Carlingford Lough. A party of fifty-two travelled to Warrenpoint by the 9-20 train, and at 12 o'clock boarded the steamer for the trip down Carlingford Lough to Greencastle, a journey which occupied fully an hour, thus giving the members ample time for enjoying the beauties of the mountain scenery for which it is famous.

After landing at Greencastle the first object of interest to examine was the tumulus or sepulchral mound, the ancient name of which has long been lost, but is believed to be the "Knocktinnel," mentioned in the Royal patent issued in favour of the Bagnalls in the sixteenth century, which name means the

Hill of the Assembly. The second object of interest was the ruins of Greencastle Church close by, the walls and west gable, surmounted by a small belfry, being all that remain. The third and most conspicuous archæological object was the old Castle, which is considered to be one of the best examples in the County of the military architecture of Anglo-Norman times.

A considerable time was spent in the inspection of these interesting remains, and Mr. William Gray, M.R.I.A., gave a sketch of their histories. The party afterwards proceeded along the shore to Cranfield Point. Here the Carboniferous limestone crops out, and a few corals and other fossils were picked up; the main scientific interest, however, being botanical. The Sea Holly (*Eryngium*) Sea Spurge (*Euphorbia Paralias*), Sea Rocket (*Cakile maritima*), Sea Radish (*Raphanus maritimus*), and the Tree Mallow (*Lavatera arborea*), occurred profusely. *Glaucium flavium*, *Salsola Kali*, *Parietaria officinalis*, *Beta maritima*, *Polygonum Raii*, and *Euphorbia portlandica* were also noted. The Wild Teasel (*Dipsacus sylvestris*) was observed at Cranfield Point. At half-past three o'clock the char-a-bancs were mounted for the return drive to Rostrevor, *via* the White-water Bridge and Mill Bay Road. Passing Woodhouse a fine squirrel was seen on one of the trees. A halt was made for tea at the Great Northern Hotel, after which a brief business meeting was held—Mr. W. J. Fennell, M.R.I.A., in the chair, and two new members—John Doran and G. L. Moore—were elected. A visit was paid to the quarry, at the back of the Hotel, to examine the so-called Rostrevor Marble, which is of a dark-greenish colour, highly crystalline.

The party returned to Warrenpoint in time to catch the 7-10 train for Belfast, which was reached at about 9 o'clock.

BALLYCARRY.

(HALF-DAY EXCURSION).

The eighth and last excursion of the Summer Session to Ballycarry took place on August 25th, when 52 members and

friends travelled by the 2-15 p.m. train. On the way down, the old Castle of Carrickfergus came in for a share of attention. The rock on which the Castle stands is understood to be part of a great dyke thrust up along some fissure, fault, or line of weakness during a period of volcanic or earthquake activity. On reaching Ballycarry a walk was taken through the village to the old churchyard. Stone-lined graves, formed of white limestone, have been found frequently, thus inferring that, as a burial place, it must be of great antiquity. The remains are those of the old Church erected in 1622, during the ministry of the Rev. Edward Brice, whose tombstone, with its armorial bearings, is still in a good state of preservation. But the chief point of interest was the handsome monument erected to the memory of James Orr, the weaver-bard of Ballycarry, a copy of whose poems Mr. Robert May brought with him to add to the interest of the occasion. Photographs of the old Church and historic tombstones being secured, the party moved away to visit the Old Mill Glen, the property of Mr. W. J. Porritt, of Redhall, who kindly permitted the party to see it. The Hart's-tongue Fern *(Scolopendrium vulgare)* luxuriated in tremendous quantities in the glen. Crested varieties of this fern were very plentiful; also *Polypodium vulgare*, var. *semilacerum*, *Circæa alpina*, and *Epipactis latifolia*. *Epipactis media* was also observed, its only other Ulster habitat being Glenarm Park, where it was noted long ago by Mr. S. A. Stewart. After tea at the Gobbins Hotel, the usual business meeting was held, the President, Mr. W. H. Phillips, in the chair. Votes of thanks were proposed to Mr. Porritt and Rev. Mr. Egerton, and passed. The latter gentleman kindly acted as guide to the old Church. One new member was elected—James Scott—after which the members returned to Belfast by the 7-30 train, reaching town at 8-20 o'clock.

Winter Session.

NOTE.—*The authors of the various Papers of which abstracts are here appended, are alone responsible for the views expressed in them.*

ANNUAL CONVERSAZIONE.

To inaugurate their Forty-fourth Winter Session the Society held a conversazione in the Large Hall, Y.M.C.A., Wellington Place, on Thursday, the 25th October. The conversazione attracted a considerable number of the general public, which, with the members and their friends, filled the spacious hall almost to overflowing. The scene was a brilliant and animated one, demonstrating the fact that the interest in the natural sciences must be largely on the increase. The exhibits were numerous, and, as usual, the exhibitors were eager to impart information to those seeking it. In order to add to the social aspect of the proceedings, tea was provided from 6-30 to 7-30 o'clock, the tables being prettily decorated with plants and flowers, at which the following ladies kindly presided:—Mrs. Fennell, Mrs. Montgomery, Mrs. Patterson, Mrs. Vinycomb, Mrs. Courvoisier, Mrs. Orr, Mrs. Gallway, Mrs. Gregg Wilson, Mrs. Hobson, Mrs. Wright, and Miss Phillips. The ladies were ably assisted by a small army of stewards, the catering being in charge of the Ulster Menu Company.

During the evening the exhibits, of which the following is a complete list, came in for considerable attention:—

BOTANY.—Botanical Section, Specimens from Club's Herbarium; N. Carrothers, Mounted Plants; Rev. Canon Lett, M.A., M.R.I.A., and Rev. C. H. Waddell, M.A., B.D., Mosses, Liverworts, and Lichens, together with Handbooks. Practical

instruction given in the examination of Mosses; H. C. Marshall, Propagation of British Ferns, &c.; Professor Gregg Wilson, D.Sc., M.R.I.A., Microscopic Demonstration—Plant Sections, &c.

Geology.—Miss M. K. Andrews, Microscopic Sections of Tertiary Rhyolites from Co. Antrim; R. Bell, *Cephalopoda;* W. Christy, Chalcedony and Opal from Carnmoney, Fish Teeth from the Cretaceous; A. Duncan, B.Sc., Carboniferous Fossils, &c.; W. H. Gallway, Chalcedonic Geode from South America, containing globule of water; J. L. S. Jackson, Liassic Fossils from Whitby, Nautilis, Ichthyosaurus, Plant remains, &c.; J. Strachan, Native Irish Silicas, including Quartz, Chalcedony, Flint, Opal, Hyalite, and Jasper. Intra-Basaltic deposits of Antrim, including Iron Ore, Bauxite, Quartz Crystals in Matrix of Bauxite, Lignite and Lithomarge, specimens of Opal, Hyalite, and Onyx, from Sandy Braes, Co. Antrim; W. J. C. Tomlinson, Eocene Fossils from Barton, Hants; J. Wright, F.G.S., Foraminifera from gravel pits in the vicinity of Belfast.

Zoology.—John Donaldson, Pond-life (microscopic demonstration); Geo. Donaldson, Butterflies, Moths and Beetles from India; N. H. Foster, M.B.O.U., Eggs of Common and Arctic Terns (*Sterna fluviatilis* and *S. macrura)* showing variation in size and colouration; W. Gray, M.R.I.A., Some forms of Hydrozoa, multiple images in Insect's eye; W. A. Green, Long-eared Bat from Lough Mourne, Horned Toad from Mexico, Alligator, &c.; W. H. Gallway, Star-fishes and Sea-urchins, Pipe Fishes; F. M. Greeves, Facsimilies of Eggs of Extinct Birds, carefully imitated from originals—viz., *Æpyornis maximus* of Madagascar, *Dinornis giganteus* of New Zealand, *Alca impennis* or Great Auk,also Collection of Lithographs of Extinct Animals; D. E. Lowry, Collection of beautiful Obsidian Flakes and Arrow Heads, &c., made by the Indians of Mexico; H. Malcolmson, Collection of British Birds' Eggs; H. L. Orr, Some Bees and Wasps and their Nests; Professor Symington, M.D., F.R.S., Microscopic Sections illustrating the Structure of Nerve Cells and Fibres; Mrs. Swanston, Collection of Birds from Florida, U.S.A.; S. M. Stears, Glossy Ibis (*Plegadis*

falcinellus) captured in Co. Down in September, clutch of Sandwich Terns' Eggs (*Sterna cantiaca*) taken in Co. Down; R. Patterson, M.R.I.A., Variations in Eggs of Herring-Gulls (*Larus argentatus*), Egg of Sandwich Tern (*Sterna cantiaca*) taken in Co. Down, first Irish Specimen of the Trumpet Fish (*Centriscus scolopax*), taken off Co. Down coast; R. Welch, M.R.I.A., Living specimens of a very local Land-Shell (*Helix pisana*), from Baltray Sandhills, Co. Louth, Living specimens of two local Slugs (*Amalia gagates* and *A. sowerbyi*).

Miscellaneous.—Miss Andrews, Views of St. Patrick's Bell and its Jewelled Shrine; R. Bell, Pre-historic Implements from Belfast Hills; Thomas Brown, Case of Unmounted Gems, Amethyst Crystals from Achill Island; W. A. Green, Bronze objects found on the pre-historic hearths, Dundrum, also Stone Implements, &c., from this and other sites of Early Man; J. Lizars, Microscopes and apparatus; R. May, Old Wooden Candlestick from Copeland Island, Ship's Hour Glass by Lee, Belfast, Flint Implements from the Soudan. Egypt, Japan, &c., Recent local Sand-dune finds; W. S. M'Kee, Polarisation of Crystals, &c.; Omagh Naturalists' Field Club, Natural History Photographs; R. Welch, M.R.I.A., Natural History Photographs.

Microscopic Demonstrations by Miss M. K. Andrews, Rev. Canon Lett, Rev. C. H. Waddell, Messrs. Gray, J. Donaldson, M'Kee, Wright, Professor Symington, Professor Gregg Wilson, and others.

At a quarter past nine o'clock a brief business meeting was held, when the President (Mr. W. H. Phillips), who occupied the chair, took this opportunity of welcoming Mr. R. Lloyd Praeger, M.R.I.A., representing the Dublin Naturalists' Field Club, and Mr. Dallinger, the President, and Mr. S. Henry, the Secretary, of the new Omagh Naturalists' Field Club. Mr. Phillips congratulated the Club on its continued prosperity, and thanked the members and visitors for supporting the efforts of the Committee to make the annual function the success it undoubtedly was. He said the Club had run eight excursions

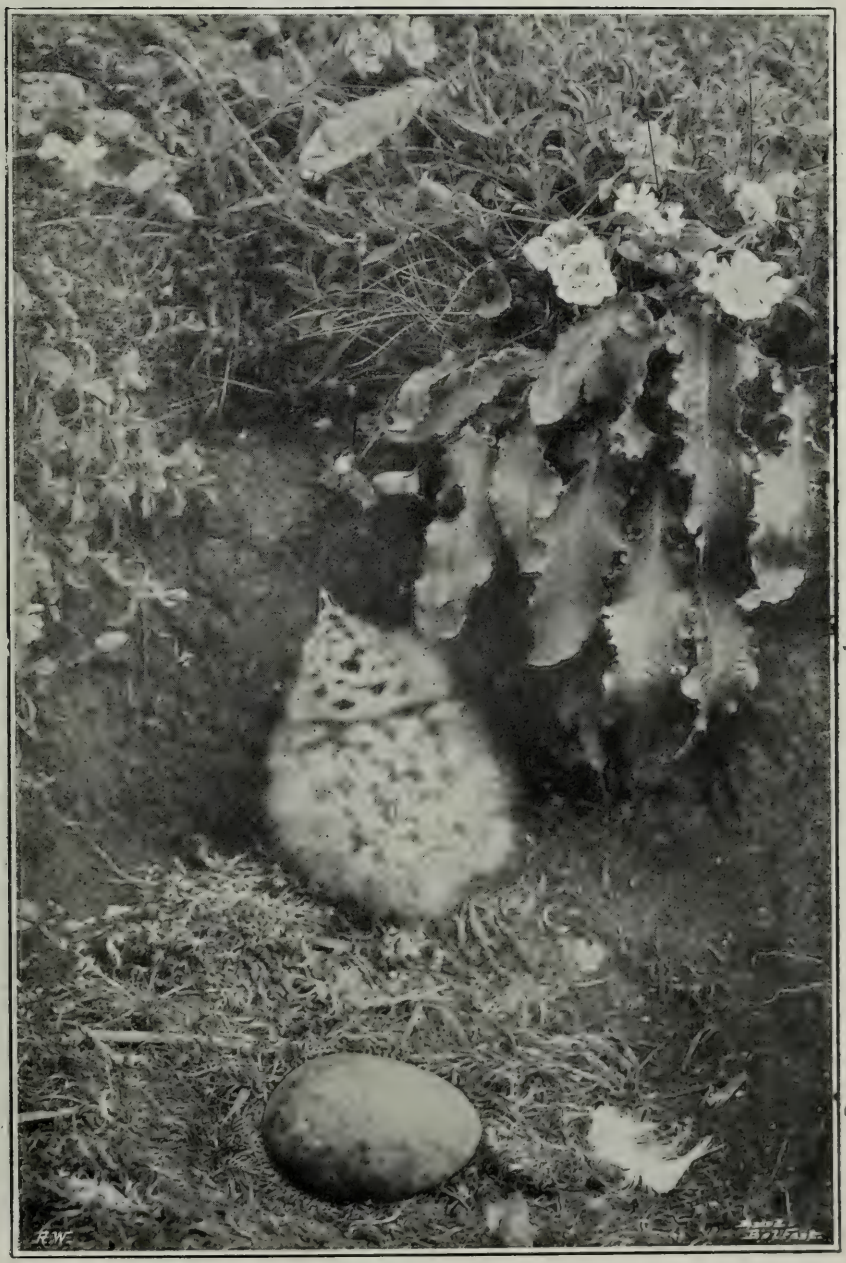


PHOTO. **Very Young Herring-Gull** R. WELCH.

(in hiding attitude beside nest, Lambay Island).


MUSEUM
NATURAL HISTORY

during the Summer months, the average attendance being sixty-three. He called for the hearty support of the members for the Winter meetings, when a series of interesting and valuable papers would be read, both at the usual monthly meetings, as well as at the informal Wednesday evening meetings. At the close of the President's brief address, thirteen new members were elected—Miss Margaret Hanna, B.A.; Miss M. M'Calmont, Miss Malcomson, Miss E. M. Cunningham, Mrs. K. M'Cully, and Messrs. A. H. Finlay, T. J. Hildege, J. M'Arthur, T. O. Miller, T. B. Henry, A. C. Sandiford, A. Duncan, and H. Booth.

The Lantern Display was then proceeded with, at which a number of beautiful slides were shown—views by Dr. Haddon, of Donegal during the Club's Excursion in July; souterrains by Mrs. Hobson; two views of the Poet Orr's Monument in Ballycarry Graveyard, by Mr. M'Kinney; sea birds in cliffs at Lambay Island, by Mr. R. Welch, M.R.I.A.; views of Shane's Castle, &c., by Mr. A. R. Hogg, and a unique slide by Mrs. Patterson, LL.D., a daughter of our esteemed member, Mr. W. Gray, M.R.I.A. The slide exhibits an Eland, new to science, and named after its discoverer. It was shot by Lieutenant Colonel Patterson, D.S.O., on the Laikipia Plateau, British East Africa. The mounted head of the animal is now in the Natural History Museum, Kensington. The slides were described by Mr. N. H. Foster, M.B.O.U., Vice-President; Mr. Robt. Welch, M.R.I.A., and Mr. W. Gray, M.R.I.A., the lantern being in the hands of Mr. A. R. Hogg.

At about ten o'clock the conversazione was brought to a close.

"BEAUTIFUL VARIETIES OF FERNS."

The first meeting of the Winter Session was held in the Museum, College Square North, on Tuesday evening, 20th November. The President (Mr. W. H. Phillips) gave his inaugural address, entitled "A talk about some beautiful

varieties of ferns," which is a sequel to that of last year on "Reproduction in ferns." The lecture was illustrated by a very large number of beautiful slides from photographs specially taken from his large collection of growing ferns by the lecturer, which were much admired.

Mr. Phillips said since ferns came to be grown by specialists and the method of producing new varieties by crossing by means of mixed spores of two or more different forms, as explained in last year's address, there seems to be no limit to what may be raised. It must be observed that the large number of varieties have sprung at first from a single wild plant, not always found by a specialist, but in a great many instances have been discovered by persons who were quite ignorant of their value, and in many cases, although observed, had been allowed to remain for years without being captured. To know and enjoy ferns thoroughly they must be sought and collected in their native habitats. This is one of the most fascinating pursuits for holiday times. It takes the fern collector into all sorts of most delightful places, all kinds of scenery. Thoreau noted the fact "that in a large sense we find only what we look for," and he defined well our powers of perception when he said that "many an object will not be seen, even when it comes within the range of our visual ray, because it does not come within the range of our intellectual ray." The fern-hunter requires a good knowledge of the normal types, a keen eye to see at a glance any difference in form, and at once secure it. Having had a successful excursion, and obtained some good specimens and brought them safely home, a garden in which to plant and tend them is most desirable. Ferns grow well with other plants; they are not unsocial. So we can have ivies in variety, which are very beautiful, both in flower and berry. Mistletoe also looks well, and is very easy to cultivate. But by all means have a plant of the "maidenhair tree," so called from its exceeding likeness to the maidenhair fern. So distinct is this tree, which is called *Ginkgo biloba*, that there is not the least danger of confounding it with any other, while it is in addition of much ornamental value and remarkably interesting,

as it is the sole representative of a type of vegetation long since extinct. *Ginkgo* is monotypic. The existing species is the sole survivor of an unknown number of others widely dispersed during geological ages over what is now the temperate and colder parts of the Northern Hemisphere. Fossil remains of *Ginkgo* have been discovered in systems that were in course of formation at a remote epoch of the earth's history, and which conclusively show that the genus is of astonishing antiquity, and that the first appearance of its ancestral form antedates that of every other existing tree by æons of time. The *Ginkgo* thus presents to us at least one form of vegetation that flourished on the earth when it was inhabited by unwieldy *Icthyosauri*, gigantic Toads, and monster *Dinotheria*, ages before man entered upon his inheritance. If the association of the *Ginkgo* with the remote past is of a kind to excite wonder, its recent history is scarcely less a subject of surprise, for the origin of the existing species is shrouded in mystery as obscure as that of its remote ancestors. Its habitat is practically unknown. No naturalist can say that he has seen it in a wild state, and hypothesis alone suggests that it may possibly be found wild in some unexplored district in Eastern Mongolia. For centuries it has been preserved alive by the Chinese and Japanese, who, by associating it with their religious worship and planting it near their shrines and temples, have invested it with a kind of sanctity that has contributed immensely to its preservation among a dense population, with whom the struggle for existence has long been of an acute kind, and whose sources of fuel and timber have always been extremely restricted. Thus preserved, it stands alone, a perfect stranger in the midst of recent vegetable forms. The variations in ferns are numerous, taking the forms of crests, tassels, plumose, congested, cruciate, toothed, and finely divided, &c. Now, to explain and show these varieties, let us commence with the Royal fern, or the flowering fern, also known as the *Osmunda regalis*, which is, as Dr. Deakin well remarks, the prince among the existing British race. It grows naturally in wet, springy, or boggy places.

Slides of five varieties were shown, three of which were found in October in Fermanagh. Next followed *Pteris*, two slides of a new variety, *Pteris Childsii*, a form of great beauty. The next group contained a large number of variations and crossings of the lady ferns, most of them of great beauty. Then followed some beautiful examples of the finer forms of *Scolopendrium*, succeeded by groups of filmy ferns, *Trichomanes*, *Todea*, and *Hymenophyllum*, remarkable for their elegance, the fronds being very delicate and translucent; next a large variety of forms of *Blechnum Spicant* or the hard fern, many of which have been found on the Mourne Mountains during the last two years. Some very fine fronds of *Lastrea* in great variety showed many points of great beauty. Next and last followed a very large number of slides of *Polystichum angulare*, showing nearly every kind of variation.

The paper was criticised by Messrs. N. H. Foster, Wm. Gray, Robert Patterson, W. J. C. Tomlinson, John Hamilton, and, Mr. Phillips having replied, the meeting was brought to a close.

"LANTERN DISPLAY."

The first Wednesday evening meeting took place in the Museum, as usual, on 28th November, and was presided over by Mr. W. J. Fennell, M.R.I.A., with whom originated the happy thought of making these meetings serve a more useful purpose by drawing the members together and introducing a series of informal lecturettes illustrating the special studies of individual members, as well as giving encouragement to the younger members to take up some particular branch of science, and so training them, as it were, to keep up the old traditions of the Club. These meetings proved so successful last Winter, thanks to the energy and enthusiasm infused into the work by Mr. Fennell, that the Committee decided to continue them this Winter and to lead off with a lantern demonstration, when a series of very beautiful slides were thrown on the screen. The following subjects were dealt with,

the exhibitor in each subject giving a brief but interesting explanation of each slide, the lantern being manipulated by Mr. A. R. Hogg, the well-known lanternist:—Architecture, views in Donegal, &c., by W. J. Fennell, M.R.I.A.; nests, eggs, and feathers, by N. H. Foster, M.B.O.U.; protective coloration in eggs and birds, young cuckoo in nest, &c., by Robert Patterson, M.R.I.A.; views of the Matterhorn, Alpine villages, by Mr. Anderson; views of Lough Derg, by Miss Walkington; a beautiful series illustrative of plant fertilisation and pollination (kindly lent by Professor Gregg Wilson), with a deeply interesting description of the slides, by Arthur Deane, curator Municipal Museum; cromleacs, souterrains, &c., by Mrs. Hobson; views on excursions, Giant's Causeway, &c., by Miss Courvoissier, this charming young lady being a keen botanist as well as a photographer; boulder-clay sections, by Miss Andrews; a fine set of slides of sea-stacks, coast denudation, granite weathering, &c., and described in an able and interesting manner, by W. J. C. Tomlinson; views of the Bann and the "Kieselghur" brickmaking industry, foraminifera, &c., by Robert Welch, M.R.I.A.; Giant's Causeway views, &c., by W. A. Green; a series of beautiful slides on the *Echinodermata* (kindly lent by Professor Gregg Wilson), and explained by W. H. Gallway; views of Sligo Abbey, Old Belfast houses and buildings, &c., by A. R. Hogg.

"LEAVES AND THEIR FUNCTIONS."

The usual Wednesday evening meeting was held in the Clubroom on the 12th December, for the purpose of hearing a short lecture by Mr. Arthur Deane, Curator of the Municipal Art Gallery and Museum, on "Leaves and their Functions." There was a representative attendance of members—the President (Mr. W. H. Phillips) occupying the chair. Mr. Deane, in introducing his subject, referred to the special characteristics of a true leaf, and by way of contrast instanced the butcher's broom plant as an illustration of leaf-like branches, the leaf-like branches of this plant having all the appearance to

the non-botanical observer of being simply leaves, but, as these seeming leaves as they bear flowers, and arise in the axils of leaves and contain green coloring matter, they perform the functions of true leaves, the latter becoming reduced; hence the reason for the differentiation. The morphological features of a leaf were next pointed out, these falling into the customary threefold division of blade or lamina, stalk or petiole, and base. Then the difference between a blade or leaf of a grass and one of a laurel, say, was indicated, the former being uniform on both sides, the latter having an upper and an under surface, or, as it is termed, bifacial. The reasons for this difference were alluded to, and also the part played by each characteristic in the life of the plants. The lecturer next dealt with the physiological functions of the leaves in a lucid manner, pointing out the part played in vegetable economy by the green colouring matter called chlorophyll, which substance under the influence of sunlight during the day assimilates the carbon dioxide contained as an impurity in the air, retaining the carbon, which goes to the formation of starch in the leaf, this starch being subsequently converted into sugar, in which form it is conveyed to the various parts of the growing plant, there to enter into new combinations with other food constituents, and so promote plant development. Other functions of the leaves, such as transpiration and respiration, were next explained, and the whole summed up by the statement that the leaves of plants are in reality workshops for producing the necessary food supplies. Before concluding, the secondary functions of some plant leaves were brought under notice, in which the carnivorous and parasitic habits of the sundews and toothwort were taken as examples. Many of the features indicated in the lecture were illustrated by simple laboratory experiments and by dried plants selected from the Club's herbarium.

The following members joined in the informal discussion which followed the lecture:—Messrs. R. Welch, M.R.I.A., H. L. Orr, A. Milligan, W. J. Fennell, M.R.I.A., W. J. C. Tomlinson, and N. H. Foster, the Rev. J. Sheils, and the Chairman.

"THE STONE AGE IN SOUTH AFRICA."

The second monthly meeting of the Winter Session was held in the Museum on Tuesday evening, 18th December—the President (Mr. W. H. Phillips) in the chair.

The preliminary science gossip half-hour was taken advantage of to present the Club, on behalf of Mr. John H. Bland, of Carnmoney (through Miss M. K. Andrews, who very kindly interested herself in the matter), with a small and interesting collection of minerals and fossils, and which goes to augment the valuable collection of minerals presented some years ago by the late General Smythe, of Carnmoney, brother-in-law to Mr. Bland. Mr. Robert Welch, M.R.I.A., exhibited a number of specimens of *Vertigo angustior*, captured at Dog's Bay, Roundstones, Connemara, by Mr. Arthur W. Stelfox, which is the first record of such a large living colony of this rare species being found in the British Islands. At eight o'clock,

Rev. W. A. Adams, B.A., of Antrim, gave a lecture on the "Stone Age in South Africa," illustrated by specimens collected by the lecturer during a visit in the summer of 1905. Mr. Adams said South Africa was at the present moment a rich field for antiquarian research, as well as for mineral wealth. Stone implements have been discovered in many parts of the country showing a wonderful likeness to those of the older stone period found in the river gravels and caves of France and the South of England. Specimens were shown from Bosman's Crossing, Stallenbosch, of this palæolithic type, some of them being found *in situ*, embedded in a clay bank, the layer containing them being in some parts several feet below the surface. They are roughly chipped on both faces, sometimes on one face only, into picklike implements, and in the opinion of Mr. Perinquay, South African Museum, Capetown, would be used as hoes in primitive agriculture. Many of these relics of a bygone age are still to be found in the Kimberley district, lying on the surface of the veldt, of a reddish colour, and often much weather-worn; scrapers and flakes, a simple kind of lance head, dressed

on one side only, and an occasional palæolith. A brief description was given of the site of a manufactory of stone implements on the banks of the Vaal River, near Kimberley, discovered by the lecturer, where he found weapons and implements of the true palæolithic type, and this site revealed also the strange fact of neolithic forms being found with them made of the same material and apparently at the same time. The rejects, with the cores and flakes, proved that it was a manufactory, perhaps of the transition period—a period very difficult to find in Europe—between the older and newer stone ages. Mr. J. P. Johnson, of Johannesburg, had traced for long distances along the Vaal River both higher and lower terraces, and he believes the association of typical palæolithic implements with the upper terrace proves the palæolithic period in South Africa to be indeed ancient. A collection of pigmy implements from Pinel and Windsorton, on the Vaal River, was next dealt with. These are very small, some being less than half an inch in length and one-eighth in breadth. Two specimens have the unique feature of ground and polished ends—one a rounded point and the other chisel-shaped. The South African implements comprise the essential forms—the crescent-shaped, triangular, rhomboidal—well known in other countries, such as the Vindhya Hills in India, Helonan in Egypt, and Scunthorpe in England. What their use was is still a puzzle, but their presence in South Africa is another link in the kinship of the early inhabitants of the country with the primitive races of other lands. Pigmy implements were also found at Hillside, Buluwayo, made out of material at hand. Very small borers were made from flakes of quartz, and some of the crescent-shaped implements from cornelian. Still going northwards, the remains of early man are now found along the banks of the River Zambesi. Perhaps the most interesting part of the exhibit was a collection of palæolithic implements from one of the headlands below the Victoria Falls. They were found in a gravel deposit where the basalt meets what is called the "desert sands." Made chiefly of chalcedony, they have a brilliant glaze, and some are well water-worn. The

water-worn implements seem to prove the existence of man on the banks of the river at a period extremely remote, in view of the report of Mr. Lamplugh to the British Association last year, who thoroughly investigated the nature of the gorge and its zig-zags, that he accepts and confirms the explanation given by Mr. Molyneux, of Buluwayo, who attributed the zig-zags to the guidance of the stream-erosion by transverse joints in the basalt plateau through which the gorge has been cut.

Specimens were examined, and a spirited discussion took place, in which the following members took a prominent part:— Mrs. Hobson, and Messrs. J. M. Dickson, Robert May, Robert Welch, M.R.I.A., John Carson, W. H. Milligan, and Robert Patterson, M.R.I.A.; and Mr. Adams having replied, a very pleasant evening was brought to a close.

"THE GEOGONY OF SOME SECONDARY MINERALS."

The members met in the Museum on Wednesday evening, 9th January (Mr. Robert Welch, M.R.I.A., in the chair), and listened with pleasure to a lecture by Mr. J. Strachan, of Ballyclare, the subject being "The Geogony of Some Secondary Minerals." In a few preliminary remarks the lecturer dealt with the advantages to the mineralogist of studying minerals *in situ*, so as to gain an insight into their modes of origin, by regarding the matrix and the contained minerals occurring in veins and cavities, together as parts, and equally important parts, of one harmonious whole. He next discussed, and briefly described, a number of common minerals which are found in the cracks and cavities of various rocks, both sedimentary and volcanic. With the aid of blackboard illustrations and numerous mineral specimens the relationship of secondary minerals to their matrix was clearly demonstrated in certain typical examples. In some cases the origin of the minerals was quite clear to the student of geogenesis, but in others scientific opinion was divided with regard to the source and mode of formation of certain minerals. The subject was then narrowed down to a discussion on the origin and formation of some

secondary minerals found in the veins and vesicles of volcanic lavas, such as the green earth series, zeolites, and siliceous minerals, like chalcedony and opal. Most mineralogists at the present day teach a theory to the effect that such minerals are derived from percolating meteoric waters in the weathering and rotting of the lava; others teach that such minerals are derived from the mother rock by a process of alteration which proceeds apace during the last stages of the lava's cooling. By some these minerals are regarded as original formations not formed by fusion, but by crystalline forces of segregation and secretion, which are at work during the final stages of the lava's consolidation. The lecturer then demonstrated his reasons for accepting and developing to some extent the last of these interpretations of observed facts, and proceeded to illustrate the theory by applying it in detail to a number of secondary deposits in various types of lavas, including basalts, andesites, and rhyolites. The zeolites of Ballypalady, the chalcedony of Carnmoney, and the opal of Sandy Braes were described in particular. The lecture was concluded by a re-statement, with slight modifications, of the "Law of Order in the Separation of Secondary Minerals in Volcanic Lavas," as first expressed in a paper read before the Club twelve months ago, and which paper as a work of original research was printed as an appendix to the proceedings of the Belfast Naturalists' Field Club for 1906.

A very animated discussion followed the termination of the lecture, the following members taking part:—Messrs. Robert Welch, Andrew Duncan, Robert Bell, Robert May, W. J. C. Tomlinson, S. Weir, and W. H. Gallway; and, Mr. Strachan having briefly replied, the meeting closed.

"CLOUDS AND THEIR EVOLUTION."

The third monthly meeting of the Winter Session was held in the Museum, on Tuesday evening, 15th January, presided over by Mr. W. J. Fennell, M.R.I.A. The usual science gossip half-hour from 7-30 to 8 o'clock was well attended, and at 8

o'clock Mr. T. E. Farrington read a paper on "Clouds and their Evolution," with limelight illustrations, during which he said that the chief difficulties in the study of clouds arise from a somewhat confused condition of the nomenclature, the mutability of the clouds themselves, and from the complexity of the operations of the natural laws which affect them. Clouds are not results of chance, but of unchanging physical laws. Representations of clouds are unavoidably inadequate, because their ever-acting light cannot be transferred to a picture. Cloud is properly defined as a visible collection of particles floating in the atmosphere. Production of clouds depends on the evaporation of water by the sun's heat, and its condensation when its acquired heat is withdrawn; and also upon the cooling effects of expansion of moist air. The presence of dust also has much to do with it. A miniature cloud may be seen when the steam escaping from the funnel of a locomotive is cooled by the air and by its expansion, and condensed into minute water spherules, called by Tyndall "water dust." In 1803 Luke Howard classified clouds under three primary types—Cirrus, Cumulus, and Stratus—which types still form the basis of cloud classification. The present official arrangement recognised sixteen kinds of cloud, but recently Mr. Claydon has described thirty-two varieties. Cumulus, or the heap-cloud, is formed by successive condensation in the upper portions of moist ascensional currents of air. If such a current is of small area or is soon checked, the cloud will be small, but if the area is larger and the current vigorous, Cumulus of great extent and grandeur will be evolved. Cumulo-nimbus, or thunder-cloud, is a development from Cumulus. When Cumulo-nimbus is not formed, Cumulus may degrade into Fracto-cumulus, or into an evening cloud, sometimes called the fall-cloud, which evaporates as the twilight advances. Common Stratus, which lies in horizontal sheets, is produced either by a very gentle ascensional current, or by a downward movement of cold air. Fog and Stratus are closely allied, and one form of Stratus is really lifted fog. Cirrus in its many forms consists of spicules of ice, but there are intermediate clouds between Cirrus and Cumulus termed "alto-clouds," the distinguishing feature of which is that they consist of water-spherules un-

frozen, although their temperature is lower than freezing point. It is amongst these clouds that the most beautiful and varied forms of waved clouds are frequent, as the result of undulatory movements in the atmosphere and irregularities of the earth's surface. Cirrus and alto-clouds are largely produced by multiplied columns of ascending air of smaller extent and of less force than those which produce Cumulus or common Stratus.

The lecture was much appreciated, and at its close Mr. Fennell criticised the paper in an able and interesting speech. The discussion was then taken up by Messrs. W. H. Patterson, William Gray, Robert Welch, and Robert May.

"GEOLOGICAL ASPECTS OF WATER SUPPLY."

The Wednesday evening meeting was held in the Museum on 23rd January—Professor Gregg Wilson in the chair—when Mr. Andrew Duncan, B.Sc., of Queen's College, read a paper on above. He said the question of water supply has not caused Irish local authorities the same worry and trouble as it has caused their neighbours across the Channel, the reason being that in Ireland there are large gathering-grounds as yet untapped from which immense quantities of fine water may be drawn. As Ireland becomes more populous and prosperous, however, and as her towns and cities develop, it is certain the problem will begin to press rather heavily on her also. Two great sources from which a community may draw a supply for public purposes are surface waters and underground waters. In many cases the poverty of the district in porous rocks makes the provision of a supply from underground sources impossible. In such circumstances recourse must be had to surface waters and a supply obtained by utilising the waters of some river or lake or by the creation of large impounding reservoirs. The civil engineer, in considering any scheme for leading in a supply of surface water, must make careful inquiries into the amount of the annual rainfall over the area constituting the gathering-ground, and he must also bear in mind that the petrographical

nature of the rocks in the district is important. For example, if the rocks in the gathering area be impervious clays or slates, rain as it falls is carried off seaward immediately, with the result that in the rainy season the brooks and rivers have a very strong flood-flow, but are low in the dry season. A satisfactory and constant water supply can only be got from such a district by excavating large reservoirs, in which the surplus water of the rainy season may be stored for summer use. When the rocks in the drainage area are of a more porous type, much of the rainfall percolates into the crust, issuing again as springs, whose waters swell the volume of the streams and rivers in the dry period. In such a district the flow of surface water is more constant, and as a result there is much less need for large reservoirs than in the case of an impervious area. In estimating the yield of water from any drainage area we must deduct from the total rainfall the loss from evaporation and from the demands of vegetation during the growing period. In all cases where surface waters are liable to contamination from agricultural and other operations, such waters must undergo a thorough filtering process. The lecturer then dealt with the class of rocks, such as sandstone and limestone, favouring the accumulation and supplies of underground waters, and the type of geological structure suitable for the connection of the various kinds of springs, and the conditions under which boring for water by artesian wells proves successful, illustrated by reference to a typical section through the County of Essex. Mr. Duncan then treated on the disadvantages of the use of underground water, as it is hard, and contains much mineral matter in solution. Wells, sewage, &c., in rural districts, and how contamination may be prevented, &c., were described. In conclusion, the lecturer referred to the subject of water-divining, with especial reference to the Holywood case, and gave it as his opinion that, from the geological nature of the rocks composing the Holywood Hills being mostly Silurian slates, it would be highly improbable that water in any volume would be discovered, although a small accumulation from surface waters might be found, but this would soon be exhausted.

At the conclusion the paper was criticised by Miss Ryan, Rev. J. Shiels, Professor Gregg Wilson, and Messrs. Robert

Welch, W. J. C. Tomlinson, William Gray, Charles Cunningham, Robert Bell, and W. H. Galway; and, Mr. Duncan having replied, the proceedings closed.

"BEES: THEIR STRUCTURE AND HABITS."

On Wednesday evening, the 13th February, a meeting was held in the Museum—Mr. Robert Patterson, M.R.I.A., in the chair—when Mr. Hamilton M'Cleery gave a lecture on "Bees." He said when one looks at a bee with any care one cannot help noticing that it has certain peculiarities which are common to all insects. In the first place it is divided into three parts by two deep constrictions dividing and separating the head from the thorax and body or abdomen; then it has three pairs of legs and two pairs of wings. The body seems to be made up of segments, which move in and out in telescopic fashion, permitting the insect to breathe. The whole body is covered with very fine hairs, which serve several different purposes, many of them being used as organs of touch, the root of each being in a small bulb containing a nerve cell, and those on the underside of the body serve to collect pollen from the flowers which the bee visits on its food-providing journeys. The breathing apparatus is worthy of much closer study. At each side of the body, on each segment, and covered by another segment, are little holes called spiracles, which are covered with a network of fine hairs, and connected with a network of tubes, beautifully made, like an indiarubber tube having a spiral wire through it to keep it from collapsing, and running to every part of the body, even to the ends of the wings. These carry oxygen to all parts, just as blood acts in mammals. Bees are produced from eggs, but only one bee in a hive lays eggs. She is called the queen, and so prolific is she that in the season when honey is in plenty she will lay 2,000 to 3,000 per day. The queen is the only perfect female in the hive, the workers being abortive females. Bees have two pairs of wings, but, as they would not be as strong for flight as if they were single, a beautiful set of hooks and eyes is provided, so that when the wings are spread out they are interlocked in such a way as to form practically a

single pair. The legs are used largely as tools. With them they keep their bodies clean, with them they put the wax in position on the comb, with them they gather pollen and perform many other functions. On the front pair of legs are two little half circles, the interior of which are lined with stiff hairs, and there is a cap to go over and complete the circle; through these are pulled the *antennæ*, those delicate organs of feeling, and probably of hearing, which protrude from the head, and so cleansed of all extraneous matter that would hinder them in the carrying out of their proper functions. The mouth organs are most interesting; the tongue is a very long elastic member, covered with a sheath, which is again covered with rows of hairs going round it. The worker has from 90 to 100 rows of these hairs; the point of the tongue is spoon-shaped. Of course the great object of the tongue is the gathering of honey. If a few drops of honey be put in a plate the bee will be seen to almost roll the tongue in it, so that the hairs get completely filled, then the other stiff organs, lips, &c., close round it; they then expand so as to make a larger vacuum higher up, to which the honey flows to fill, and so on to the honey sac, in which it is carried till brought back to the hive, when it is discharged into one of the cells of the comb. The eyes of the bee are very complex. There are three simple and two compound. The latter consist of a great number of facets, each of which has a perfect lens. As many as 6,300 facets have been found in one of the compound eyes of the worker, while the drone has often twice this number. The sting is made of three parts—a sheath and two darts, which form a sort of tube, down which a small amount of a very irritant poison is propelled. It is a popular belief that the bee goes from flower to flower when collecting honey; but this is not so, as it will be found that the little insect confines itself to one species of flower on each journey, which provides honey of one sort, and thus prevents a cross-fertilisation, which would be anything but desirable.

The lecture was illustrated by a series of beautiful lantern slides, showing the structure and different parts of the anatomy of the bee. Messrs. Robert Patterson, M.R.I.A., George Donaldson, W. J. C. Tomlinson, and W. H. Gallway took part in the discussion which followed the close of the lecture.

"RESULTS OF AN INVESTIGATION OF THE DRIFT OF THE IRISH SEA."

The fourth meeting of the Winter Session was held in the Museum on 19th February, presided over by Mr. Nevin H. Foster, Vice-President. The usual science gossip half-hour was held between 7-30 and 8 o'clock, during which Mr. Robert Patterson, M.R.I.A., exhibited and described different parts of the anatomy of the whale which was stranded on Magilligan sands a few months ago, a most amusing account of a visit to which appeared in the "Northern Whig" recently. At eight o'clock Mr. Charles M. Cunningham delivered his lecture on "Results of an Investigation of the Drift of the Irish Sea," illustrated by a number of very interesting limelight views. He said that for a considerable time past he had been conducting a series of experiments with bottles and other objects to obtain a knowledge of the drift of the Irish Sea. He undertook the work on behalf of the Ulster Fisheries and Biology Association of Larne, and it was mainly carried out by the use of a bottle 5½ inches long by 1¼ inch wide, with a capacity of 2 fluid ounces. This bottle was carefully adjusted to float upright with only the cork exposed to the wind. Other materials were introduced to eliminate results that might be due to the special material chosen. Each bottle contained a post-card to be returned by the person finding it. The bottles were distributed from steamers at suitable points, the area covered being from Arran in the Firth of Clyde to the Scilly Islands. The period of observation lasted from June 12th, 1903, to December 31st, 1906. 607 cards were returned, or practically 50 per cent. of the number sent out. 473 had travelled northwards, 128 had gone southwards, 457 were found on the British Coast, and 145 on the Irish Coast. One was found north of Trondhjem, in Norway, two were found on the Dutch Coast and two in Brittany. The general conclusions arrived at are—that there is a strong northward drift throughout the year, modified by a southward drift during the months of March, April, May, and June. Six returns from deep-drift instruments indicate a stationary condition at the bottom. The lecturer had evidently devoted a considerable amount of time and trouble to his

investigations; and his methods for sealing the bottles to make them watertight and floating adjustments were both ingenious and clever. Altogether he may be heartily congratulated on the results of his labours.

"WHO WERE THE FAIRIES?"

At the close of the above lecture Mr. E. J. M'Kean, B.A., B.L., favoured the members with a short lecture on "Who Were the Fairies," and in dealing with his subject said that the study of folk-lore in modern fashion was only fifty years old, but many interesting problems had arisen—one of these being connected with the fairies. At first tradition associated the fairies with pagan gods and spirits, but against this theory is the well-known fondness of fairies for social gatherings, whereas the gods were the reverse of social. Another and most favoured theory is that the fairies are a tradition of a pagan ghost-world. Most pagan nations believed in fairies, and the ghosts of savages were supposed to be among the living and to be very powerful. Fairies were often found in close association with ghosts. Again, it was thought that the fairies were a tradition of a vanished dwarf race; this theory appealed especially to Scotch and Welsh folk-lorists. The woman-stealing propensities of the fairies is simply a tradition of bride-capture, not altogether confined to the little people, however. Probably it is safer to look upon the fairies as a traditional people, the elements of whose being are made up partly of descendants of pagan deities, partly of ghosts, and partly of vanished peoples, or at any rate of earlier stages of civilisation. Both lectures were highly interesting, and were listened to with attention and enjoyment. The usual discussion took place at the close, in which the following members took a prominent part:—Messrs. Nevin H. Foster, M.B.O.U., Robert Patterson, M.R.I.A., Robert Welch, M.R.I.A., Robert May, and Professor Gregg Wilson.

"MOUNTING MICROSCOPIC OBJECTS."

Mr. Hugh L. Orr presided over a meeting in the Museum on the evening of 27th February, when Mr. William Gray,

M.R.I.A., gave a practical demonstration on collecting, mounting, and preserving microscopic objects, such as may be most helpful for the purposes of the ordinary members of the field club. A selection of the simplest forms of apparatus was exhibited, together with samples of the cements, varnishes, and preservative fluids required for the several processes in the manipulation of microscopic slides. The uses to which such materials are applied was practically demonstrated by Mr. Gray, who from the crude materials supplied, prepared excellent slides finished for the cabinet. By means of a large number of slides from his own cabinet, and prepared by himself, Mr. Gray illustrated the wide range of attractive and instructive subjects in the animal, vegetable, and mineral kingdoms that are at the command of the members of the club in our own locality, or at an easy distance from Belfast. Mr. Gray's slides included structural details of land and marine plant life, from the giant tree to the lowly fern, moss, and *algæ*, illustrating their decorative details, mechanical contrivances, variety, and endless beauty. The vertebrates and invertebrates of the animal kingdom were also illustrated from the higher mammalia to the lowly shell-fish, crustacea, echinodermata, hydrozoa, and sponges. Even the rocks of Antrim furnished some geological slides of great interest, the sections having been specially cut for Mr. Gray. The evening's microscopic display demonstrated what a wide field of interest and most enjoyable research is open to the student who studies natural objects, particularly the lowly forms of plants and animals that people by millions the unfrequented paths of the ordinary observer. Many members brought their microscopes and followed with keen interest Mr. Gray's methods, embodying as they did his vast experience in his subject, gained after many years of close study. A hearty vote of thanks was accorded to Mr. Gray, who suitably replied, and referred to the microscopic work done by other members of the club, and particularly to the excellent preparations of selected diatoms by Mr. William A. Firth, also the valuable researches and report on foraminifera by Mr. Joseph Wright, F.G.S., and the beautiful slides of foraminifera prepared by Mr. Charles Elcock.

"NUPTIAL CHANGE IN PUFFIN'S BILL."

The usual Wednesday evening meeting was held in the Museum, College Square North, on 13th March, when a paper was read by Mr. Robert Patterson, M.R.I.A., on "The Nuptial Change in the Bill of the Common Puffin." The chair was occupied by Mr. Nevin H. Foster, M.B.O.U., Vice-President. After referring to the opportunity that these informal Wednesday meetings afforded the members of the Club to bring forward subjects for discussion that would not occupy the whole evening, Mr. Patterson proceeded to state that his paper was based on a translation of an important article by a French ornithologist, Dr. Bureau, who had the satisfaction of being the first to witness and describe the extraordinary moult in the bill of the puffin that takes place early every season. By means of diagrams the various horny pieces that drop off the bill after the breeding season is over were clearly shown. For many years ornithologists were of the opinion that there were two species of puffins—one of which was found here in Summer, breeding in large colonies, and that had a large and rounded bill, and the other which was only found on sea beaches after severe storms, and in which the bill was very much smaller, quite a different shape, and not so brilliantly coloured. Dr. Bureau was able to show by the production of specimens from the islands of the coast of France that by the dropping off of nine horny plates of the bill the one species merged into the other, and that the second supposed species was merely the puffin in Winter plumage. Mr. Patterson concluded by drawing attention to the fact that it was not necessary to travel to foreign lands to make important zoological discoveries, and he urged the members of the Belfast Field Club to further exertions in the investigation of the fauna and flora that lie at our doors. The diagrams were excellent, especially one drawn and coloured to nature by Mrs. Patterson, and which showed the nine parts composing the bill of the puffin during the breeding season. The following joined in the discussion at the close of the lecture:—Mrs. Patterson, Messrs. Nevin H. Foster, Hugh L. Orr, W. J. C. Tomlinson, George Donaldson, and W. H. Galloway—after which Mr. Foster announced that a new species had

this year been added to the British avifaunal list—the Black Lark (*Melanocorypha yeltoniensis*), of which several had been seen and specimens obtained in Kent and Sussex in January and February. This bird is an inhabitant of Southern Russia, Transcaspia, and Western Siberia, but had previous to this year only been reported as a straggler to Western Europe, a few times from Austria, Belgium, and Heligoland.

"LAMBAY ISLAND: ITS FAUNA, FLORA, AND ANTIQUITIES."

A lecture was delivered in the Museum, College Square North, on Tuesday evening, 19th March, entitled "Lambay Island: Its Fauna, Flora, and Antiquities." The chair was occupied by Mr. W. H. Phillips, President, and there was a large attendance.

Mr. R. Lloyd Praeger, M.R.I.A., of Dublin, who was the first speaker, dealt with the geology, botany, history, and antiquities of the island. He stated that Lambay was at present in the possession of the Hon. Cecil Baring, who lived in the old castle on it. He had pointed out to the owner that a systematic examination of the fauna and flora might lead to important scientific results, and add to the interest which he had already felt in the native inhabitants—animal and vegetable—of the island. Mr. Baring accepted the suggestion at once, and workers in the various branches of natural history were enlisted, the survey being begun in June, 1905. Other visits were made in the following year, and on all occasions the naturalists were the guests of Mr. and Mrs. Baring. The main object of their work on Lambay was simply the study of an island fauna and flora, and, while as a contribution to that subject they hoped that their results might possess some general interest, they did not anticipate that the actual species inhabiting the island would furnish distributional records of more than purely local value. The results, however, in this direction proved that they were wrong. Five Lambay species (three worms, a mite, and a bristle-tail) were new to science, and twelve other animals were



PHOTO. R. WELCH.

Lambay Island.

Top of ea tern cliffs in June, looking south from Flint Rock. *Armeria maritima*, in bloom in front; *Matricaria inodora* (dark foliage) behind.


BRITISH MUSEUM
NATURAL HISTORY

additions to the Britannic fauna. (Applause.) The additions to the fauna and flora of Ireland totalled between eighty and ninety species, and, while some of these additions resulted from the study of groups which had hitherto been almost unworked in this country, in many other cases additions were now made to groups of which the Irish list might be regarded as tolerably complete. Speaking of the geology of Lambay, Mr. Praeger said that practically all the rock crags faced west or south-west. This was primarily due to the tilt of the strata, which dipped generally, and at a fairly low angle, towards the east, and thus the edges of the beds appeared in the scarps. The various rocks which go to build up the island were divisible into two main groups—those of sedimentary origin and those formed by igneous activity. Of the Lambay mammals referred to by Mr. Praeger special reference was made to the Grey Seal, which could be seen oftenest near the caves, and which was sometimes seven or eight feet in length. It was rare in the larger islands of Great Britain, and Mr. Baring had in it a gold mine from a zoological point of view. (Applause.)

Mr. Robert Patterson, M.R.I.A., took up the second portion of the lecture, which dealt with bird life on the island. He said it would be apparent to most that the avi-fauna of Lambay must depend upon the sea birds for its richness, variety, and interest. The only trees were those immediately round the castle, and they were mostly well occupied by noisy Rooks and Starlings. There were one or two wind-swept hedges, but, speaking roughly, there was not sufficient woody cover to induce the ordinary land birds to stay on the island in any numbers. Meadow-Pipits and Wheatears breed in some numbers, and these species were certainly the most obvious land birds in the island in summer. He had been surprised to meet with the Blackcap Warbler in the summer of 1905. It was a regular summer visitor to County Dublin, although almost unknown in the North. The position of the island, lying, as it seemed to do, in the track of migrating small birds, brought a variety and charm of its own. He and Mr. Foster found on the 15th April, 1906, innumerable Willow-Wrens evidently just arrived. Hundreds of them swarmed in the

lane, in the plantation, in the garden, and along the old hedge that runs south from the garden wall. By the afternoon of that day (15) they had spread all over the island, but the next day they had almost all gone on, and the few that were left were singing lustily. Probably the bird that Mr. Baring took most care of was the Peregrine Falcon. The Peregrine laid her eggs on the bare rock, and the young birds—little masses of snow-white down—were successfully hatched out. The Common Puffin seemed to form the chief food of the Peregrine on Lambay. It was a wonderful experience to be rowed slowly round the island on a calm day in June when one was almost deafened by the cries of the birds disturbed in their parental duties, and sea and sky were thick with white Gulls, black Cormorants, and black and white Auks, flying hither and thither in seeming confusion and alarm. (Applause.) All day long the chorus of Gulls never ceased, the soprano of the Kittiwakes blending with the baritone of the Herring-Gulls and the bass of the Black-backs. And when night came on the Shearwaters joined in, their mysterious and unbird-like calls, heard all round one at once, rising and falling according to the distance of the unseen producers of the weird sounds, giving the impression that angry and vindictive spirits were about. Of all the Sea-Gulls the little Kittiwake was the most attractive. But the Herring-Gull was the dominating Gull of Lambay, the young ones being pretty and quaint. Both the Greater and Lesser Black-backed Gulls breed on Lambay. The Puffins were the most comical of all the birds of the island. They breed in holes in the cliff slopes, and very often in rabbit holes, though they could make holes for themselves. A few Cormorants and a good many Shags breed on the cliffs, and also some Razorbills and Guillemots. There were more points, Mr. Patterson said in conclusion, that he could bring forward, but perhaps those present that evening had seen enough to realise that Lambay was a sea-bird's paradise. (Applause.)

Mr. Robert Welch, M.R.I.A., concluded the lecture, and, in dealing with Land and Marine Mollusca, he said—The Marine Shells collected number 117 species, a very fair list, considering that cliffs almost surround the island, so the only

possible collecting grounds were the sandy strip a quarter of a mile long north of the harbour, and some rocky shores with rock pools south of it. In the four days collecting here about sixty species of the larger and commoner species were found, the balance, mostly the tiny species, were found in shell-sand and seaweed siftings. Six of the species were Nudibranchs (or sea slugs), one of them new to the east coast fauna. The shell sand proved very rich. Mr. Colgan, who examined it, found 77 species, a larger number than has been found in shell sand on any part of the mainland coast of Dublin. The 117 species are equal to the number yielded by the famous Velvet Strand at Portmarnock, one of the best-known shell strands in the British islands, and twenty-three species over the number hitherto obtained on the Dublin coast at Rush, opposite the island, where there are many excellent collecting grounds. A little dredging was done in four fathoms off Saltpan Bay, and in two fathoms off the harbour, but this only yielded four species not found in the shore collecting. Among these was the leg-of-mutton shell, *Aporrhais*, so common in gravelly rock-pockets at Bangor, but so very rare on some coasts. As even the famous Dog's Bay shell-sand finds, added to those from the shore-collecting there and on Arran Island in 1895, give us 112 species only as compared with the 117 species of Lambay, the latter must be considered a specially good list for the east coast, even if it was collected from a much larger area than was the case. Lambay cannot be considered an ideal habitation for land mollusca, still less so for the freshwater species. There is too little permanent moist shelter for the one, and ponds and streams for the other are almost absent. The lower ground on the western side of the island provides the main habitats, the higher eastern slopes being for weeks at a time as dry as a dusty road. The few little remnants of the ancient native scrub or forest growth are mainly some old and stunted elder trees, and the deer sheltering under them at night render them unsuitable habitats. We did not even find a tree slug on them. The species that might be called woodland species are compelled to take shelter in stone heaps, old field dykes, and in the moist rocky debris of the talus under the cliffs at Calico Hole. This talus, being on the north side of

the island and largely protected from the sun's rays, has sufficient moisture for a thick growth of scurvy grass and sea campion, and it is at the roots of these that a tree species *(Clausilia)* has its habitat, and some other species were much more abundant here than elsewhere. The most interesting species on the island are three xerophile or sun-loving species—*Helix acuta, H. intersecta,* and *H. virgata.* Hitherto two of these only have been found on Rathlin and Great Arran Island, and these are the only island records we have except Achil. The third (*Helix intersecta*) has not been found on any other Irish island that I am aware of. It has only recently been added to the Antrim fauna by Mr. Arthur Stelfox from Bush Bay, where it is very local and rare, though it is abundant in County Derry, at Portstewart, and near Magilligan. We have only one or two Donegal records, and none in County Down, though there are many suitable habitats in the coast sandhills. One of our most interesting finds was *Helix acuta,* alive, in the wettest part of the marsh, at Raven's Well, high up on the cliffs, an utterly unsuitable habitat in every way, as this species, like all the xerophile group, detests peaty areas, and cannot live on them for any length of time. The shell was likely carried here attached to a bird's foot, or possibly one of the deer may have been the means of transport. This is the first time we have heard of this species living under such conditions. It is strictly a maritime species in Great Britain, but in Ireland lives inland on the dry sandy desert of the central plain, though not in the same abundance with which it may be met on the coast sandhills. (Applause.)

In connection with the visits of the Naturalists to Lambay, a large number of photographs of birds, landscapes, &c., were taken by Mr. R. Welch, Mr. G. E. Low, and the Hon. Cecil Baring, and these were on Tuesday evening thrown on the screen by Mr. Hogg, and added considerably to the interest of the lecture throughout.

At the close, on the motion of Mr. N. H. Foster, M.B.O.U., seconded by Mr. Arthur Deane, a hearty vote of thanks was passed to Messrs. R. L. Praeger, Robert Patterson, and Robert Welch for their admirable papers. A similar compliment was

paid to Mr. Baring for his hospitality to the members of the Club, and particularly for the special care and attention which he had shown in the plants and animals of Lambay Island.

"FRUITS AND VEGETABLES."

At the last informal meeting of the Club, which took place on Wednesday evening, 27th March, in the Clubroom, Museum, College Square North, Mr. Arthur Deane gave a short lecture on "Fruits and Vegetables." The chair was occupied by Mr. Robert Patterson, M.R.I.A. Mr. Deane commenced his thesis by stating that in the life history of a plant there were two periods—the vegetable and the floral. The function of the latter was to produce seed, and during the formation of seeds a certain part of the flower persisted until the seeds were ripe, and this was termed a fruit. No matter whether it was like a pea-pod or an apple it was always called a fruit. He then proceeded to describe simple and compound fruits and the infructescence. Fruits could be divided into those that were dry and those that were fleshy. Dry fruits were provided for dispersal by wind, water, or to be carried away in the fleece of passing animals instead of falling in a dead calm beneath the parent plant, and assisting themselves in the struggle for existence. Fleshy fruits were usually adapted for carrying inside the bodies of animals, and in such cases the seeds are protected by a thick leathery coat, so that they will not be acted upon by the gastric juices of the body of the animal, the warmth of which often commenced the process of germination. In different fruits it was seen that different parts of the flower persisted to form the flesh of such fruits as tomato, apple, orange, cucumber, and strawberry. The colour assumed by ripe fruits often assists in alluring animals by forming a great contrast to the background of green foliage, as the berries of the holly and the strawberry. Another important point about fleshy fruits was that before becoming ripe they were usually distasteful to animals, but when the seeds were ready for dispersal the acids were changed into sugar, and so birds and other animals were attracted to eat them. Examples of fruits were spoken of which appeared to

be imperfectly understood. The cow-wheat was supposed to resemble the cocoons of ants, and one observer stated that ants do actually carry them to their nests, and if this was so the seeds would find a fine germinating bed in the tilth of an ant hill. It was possible to find in the fruit-head of the common marigold three different kinds of fruits—some with wings, which were evidently adapted for wind dispersal; others with hooks for hanging on to the coats of passing animals, while a third allured birds by resembling a green caterpillar. Vegetables used in cooking were derived from any part of the plant. The tomato, cucumber, and marrow were given as examples of fruits. The potato was an underground stem, which had become a storehouse for reserve food material. Turnips, beets, parsnips were examples where the taproot had become modified, for during the first year they were stored with food, but in the second year this food was utilised for the formation of seed. In the asparagus it was the bud which was eaten, and when asparagus was stringy it was due to the food-conducting tubes or vascular bundles being well developed; while Brussels sprouts were simply small cabbages produced as buds in the leaf axils on the main stem, while the white fleshy centre of the cauliflower furnished an example of modified flowers. In the discussion which followed Messrs. Robert Welch, G. Donaldson, N. Carruthers, W. H. Gallway, C. Cunningham, and the Chairman took part.

"CONTINENTAL GLACIATION."

A lecture under the auspices of the Irish Field Club Union was delivered in the Museum, College Square North, on Tuesday evening, 9th April, by Professor Grenville A. J. Cole, F.G.S., M.R.I.A., the well-known Dublin scientist, who chose for his subject "Continental Glaciation." The chair was occupied by the President (Mr. W. H. Phillips).

Professor Cole, in the course of his lecture, said that despite local cycles of increase and decrease, they were familiar everywhere in Europe with the fact that glaciers are shrunken

remnants of those that formerly spread far into the drift-covered lowlands around their mountain chains. They had, moreover, in Europe and North America widespread traces of still larger and broader ice flows when these areas suffered from what might be called continental glaciation. The plain of Northern Germany, from the Baltic to the Saxon hills, was thus cumbered with glacial drift, resting on surfaces that nowadays persuaded them of the passage southernward of continuous ice. Whether such continental ice thrust out the waters of a shallow sea, or whether it moved over dry land previously dry, was of little moment in comparison with the question of its extensive invasion of lands far from its own gathering ground. Some hints as to the aspect and conditions of the lowlands during such invasions might still be found on the comparatively temperate margins of Spitzbergen, Alaska, and Greenland. The enormous amount of material carried within continental ice was especially impressed on observers in Greenland, where practically no moraines appeared upon the surface. This material was partly stratified by dragging movements in the ice, and was re-arranged in fan deltas and drumlins by the swirls of water as the ice began to melt away. A large part of their glacial deposits in Ireland must be ascribed to continental glaciation. The facts of such glaciation in olden times, notably those of the widespread Permian glaciation, which was illustrated in the present lecture, threw them farther and farther into the dark as to a cause for climatic changes of such magnitude. (Applause.)

Professor Cole's lecture was illuminated by a number of very beautiful slides of ice-floes and glaciers from nearly all parts of Europe, Africa, and America, and also striated rocks from different parts of Ireland.

Some discussion followed, in which Madame Christen, Professor Gregg Wilson, Messrs. William Gray, M.R.I.A., R. Welch, M.R.I.A., A. Milligan, and W. J. C. Tomlinson took part.

A vote of thanks to the lecturer, on the motion of Professor Wilson, seconded by Mr. R. Welch, was heartily passed.

The election of four new members—Miss Ethel M. Webb, Messrs. Charles S. M'Neill, F. Balfour Browne, M.A., and George Raymond—concluded the proceedings.

ANNUAL MEETING.

The Forty-fourth Annual Meeting was held in the Museum, College Square North, on 17th April—the President (Mr. W. H. Phillips) occupied the chair. The Secretary (Mr. W. H. Gallway) read the Annual Report. The Treasurer (Mr. W. H. Phillips) submitted his Statement of Accounts. The Reports of the Librarian and Geological Section were read by Mr. J. L. S. Jackson; the Botanical Section Report was read by Mr. N. Carrothers, and the Report of Sub-Committee who adjudicated on collections submitted in Competition for prizes offered by the Club, was read by Mr. R. Welch.

The President formally moved the adoption of the reports and statement of accounts, which was seconded by Mr. N. H. Foster, Vice-President, who congratulated the Club on its improved membership and general prosperity, and the reports were passed.

A hearty vote of thanks was moved by Mrs. Fennell and seconded by Mr. William Gray to the retiring President (Mr. W. H. Phillips). And, on the motion of Mr. William Gray, seconded by Mr. Robert Patterson, a cordial vote of thanks was accorded to Mr. W. J. C. Tomlinson; both motions being heartily supported by the members, and carried by acclamation.

Mr. W. J. Fennell moved, and Mr. Robert Welch seconded, that Mr. Robert Patterson, M.R.I.A., be elected President, which was passed.

Mr. T. Anderson proposed, and Mr. H. E. Brothers seconded, that Mr. Nevin H. Foster, M.B.O.U., be re-elected Vice-President, which was also passed.

Mr. W. H. Phillips was re-elected Treasurer, on the motion of Mrs. Fennell, seconded by Mr. George Donaldson.

Mr. J. L. S. Jackson was re-elected Librarian, on the motion of Mr. Robert Bell, seconded by Mr. W. R. Pim.

Mr. W. H. Gallway and Mr. J. N. Milne were elected Hon. Secretaries, on the proposal of Mr. Arthur Deane, seconded by Mrs. Courvoisier.

The following were elected Members of Committee:—Messrs. Robert Bell, N. Carrothers, George Donaldson, W. J. Fennell, M.R.I.A., W. A. Green, H. C. Marshall, Hugh Lamont Orr, W. J. C. Tomlinson, Robert Welch, M.R.I.A., and Professor Gregg Wilson, M.A., D.Sc., M.R.I.A.

Suggestions of suitable places to be visited during the coming Summer Session having been put forward, the following were elected members:—Miss Clara Patterson, Mrs. Robert Patterson, Miss E. Johnston, Messrs. John Parkhill, S. Johnston, and W. Chambers, which concluded the proceedings.

RULES

OF THE

Belfast Naturalists' Field Club,

1907-08.

I.

That the Society be called "The Belfast Naturalists' Field Club."

II.

That the object of this Society be the practical study of Natural Science and Archæology in Ireland.

III.

That the Club shall consist of Ordinary, Corresponding, and Honorary Members. The Ordinary Members to pay annually a subscription of Five Shillings, and that candidates for such Membership shall first pay an entrance fee of 5/-, and be proposed and seconded at any meeting of the Club, by Members present, and elected by a majority of votes of the Members present.

IV.

That the Honorary and Corresponding Members shall consist of persons of eminence in Natural Science, or who shall have done some special service to the Club; and whose usual residence is not less than twenty miles from Belfast. That such Members may be nominated by any Member of the Club, and on being approved by the Committee, may be elected at any subsequent Meeting of the Club by a majority of the votes of the Members present. That Corresponding Members be expected to communicate a Paper once within every two years.

V.

That the Officers of the Club be annually elected and consist of a President, Vice-President, Treasurer, Librarian, and two Secretaries, and ten Members who form a Committee, and shall hold not less than eight Meetings in the year. Five Members to form a quorum. No Member of Committee to be eligible for re-election who has not attended at least one-fourth of the Committee Meetings during his year of office. That the office of President, or that of Vice-President, shall not be held by the same person for more than two years in succession.

VI.

The Committee may from year to year appoint a Sectional Committee as may be considered desirable to further original investigations in any one or more departments of the Club's work. Each Sectional Committee to be composed of six Members of the Club, not less than two being Members of the Club's Committee. No financial responsibility to be incurred by the Sub-Committee or any Officer of the Club without the previous approval of the Club's Committee. Any Sectional Committee may elect its own Chairman and Secretary from its Members.

VII.

That the Members of the Club shall hold at least Six Field Meetings during the year, in the most interesting localities, for investigating the Natural History and Archæology of Ireland. That the place of meeting be fixed by the Committee, and that five days' notice of each Excursion be communicated to Members by the Secretaries.

VIII.

That Meetings be held Fortnightly or Monthly, at the discretion of the Committee, for the purpose of reading papers; such papers, as far as possible, to be original and to treat of the Natural History and Archæology of the district. These Meetings to be held during the months from November to April inclusive.

IX.

That the Committee shall, if they find it advisable, offer for competition Prizes for the best collections of scientific objects of the district; and the Committee may order the purchase of maps, or other scientific apparatus, and may carry on geological and

archæological searches or excavations, if deemed advisable, provided that the entire amount expended under this rule does not exceed the sum of £10 in any one year.

X.

That the Annual Meeting be held during the month of April, when the Report of the Committee for the past year, and the Treasurer's Financial Statement shall be presented, the Committee and Officers elected, Bye-laws made and altered, and any proposed alteration in the general laws, of which a fortnight's notice shall have been given, in writing, to the Secretary or Secretaries, considered and decided upon. The Secretaries to give the Members due notice of each intended alteration.

XI.

Members of other Irish Field Clubs, residing temporarily or permanently in or near Belfast, may be enrolled Members of the Club without election or entrance fee on production of a voucher of membership of another Club, and without subscription for the current year, on production of a receipt showing that such subscription has been paid to another Club. Failing the production of such receipt, the usual subscription for the current year to be paid to the Treasurer on enrolment. The names of Members so admitted to the Club to be published with the notice of meeting following the date of their enrolment.

XII.

That, on the written requisition of twenty-five Members, delivered to the Secretaries, an Extraordinary General Meeting may be called, to consider and decide upon the subject mentioned in such written requisition.

XIII.

That the Committee may be empowered to exchange publications and reports, and to extend the privilege of attending the Meetings and Excursions of the Belfast Naturalists' Field Club to Members of kindred societies, on similar privileges being accorded to its Members by such other societies.

RULES FOR THE CONDUCTING OF EXCURSIONS.

I. The excursion to be open to all Members, each one to have the privilege of introducing two friends.

II. A Chairman to be elected as at ordinary meetings.

III. One of the Secretaries to act as Conductor, or, in the absence of both, a member to be elected for that purpose.

IV. No change to be made in the programme, or extra expense incurred, except by the consent of the majority of the Members present.

V. No fees, gratuities, or other expenses to be paid except through the Conductor.

VI. Every Member or Visitor to have the accommodation assigned by the Conductor. Where accommodation is limited, consideration will be given to priority of application.

VII. Accommodation cannot be promised unless tickets are obtained before the time mentioned in the special circular.

VIII. Those who attend an excursion without previous notice will be liable to extra charge, if extra cost be incurred thereby.

IX. No intoxicating liquors to be provided at the expense of the Club.

Exchanges of Proceedings.

Aberdeen Working-men's Natural History and Scientific Society.
Transactions, No. 5, 1905-1906.

Bath Natural History and Antiquarian Field Club.
Proceedings, Vol. XI., Part 1, 1906.

Belfast—Natural History and Philosophical Society.
Report of Proceedings, 1905-1906.

„ Ulster Journal of Archæology.
Vol. XII., Parts 2, 3, 4. Vol. XIII., Part 1.

Berlin—Helio Abhandlungen und Mitteilungen, 1905.

Berwickshire Naturalists' Club.
Proceedings, Vol. XIX., Part 2, 1904.

Brighton and Hove Natural History and Philosophical Society.
Annual Report and Abstracts of Papers, 1905.

Bristol Naturalists' Society.
Proceedings, Vol. I., Part 2, 1905.

Cardiff Naturalists' Society.
Report of Transactions, Vol. XXXVIII., 1904-5.

Dublin—Royal Irish Academy.
Proceedings, Section B, Vol. XXVI., Parts 2, 3, 4, 5, 6.
„ „ C, Vol. XXVI., Parts 1, 2, 3, 4, 5, 6, 7, 8, 9.

„ Royal Society of Antiquaries of Ireland.
Journal, Vol. XXXV., Part 4. Vol. XXXVI., Parts 1, 2, 3, 4.

Dumfriesshire and Galloway Natural History and Antiquarian Society.
Report, Vol. XVII., Parts 3, 4, 5.

Edinburgh Field Naturalists' and Microscopical Society.
Transactions, Vol. V., Parts 1, 2, 3.

Edinburgh—Botanical Society.
Transactions and Proceedings, Vol. XXII., Parts 1 and 2.

„ Geological Society.
Transactions, Vol. VIII., Part 3.

Frankfort—Bericht der Senckinbergischen Naturforschenden.
Gesellschaft, 1905.

Glasgow Natural History Society.
Report and Proceedings, 1901 and 1902.

„ Philosophical Society.
Proceedings, Vol. XXXVII., 1905-1906.

Hamilton Association.
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